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New Health Programs in the United States

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IT is a great pleasure to participate in this joint meeting of the State and Provincial Health Authorities of North America and the Canadian Public Health Association. With such co-operative planning and discussion of mutual problems, we can progress toward the achievement of our common goal—the better health of our peoples.

Your program committee has asked me to discuss with you the new health programs in the United States. This is a particularly appropriate time to make an estimate of our achievements, since some of our greatest advances in public health have been made during the last decade. It was in 1935 that the Social Security Act first authorized financial grants to States for strengthening their general public health programs and for inaugurating maternal and child health activities. Other programs were added to these in rapid succession. First, there was the venereal disease control act, then the National Cancer Institute and tuberculosis acts. During the war, we set up emergency sanitation and community facilities programs, provided nearly 180,000 student nurses with professional education, and through the Emergency Maternity and Infant Care Program of the Children's Bureau provided care for almost 1,150,000 mothers and about 180,000 infants—families of men in the lower-pay grades of our armed forces.

More recently, hospital construction and mental health acts have been passed and research programs have been expanded greatly.

Last August, the Congress took a major step toward making hospital and public health facilities more widely available when they passed the Hospital

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Survey and Construction Act. It is recognized that maldistribution of hospitals and clinics is closely related to maldistribution of health and medical personnel, and to medical economics. The Hospital Act has been specifically designed to help correct these maldistributions—to equip medical and health personnel with the tools and workshops necessary to bring good health to the communities where the people live.

Under this legislation, we shall be engaged in the most extensive hospital construction program ever undertaken. The Act makes possible a total expenditure of nearly a billion and a quarter dollars of combined Federal, State and local funds over a five-year period. Its purpose, as defined in the Act, is to assist the States "(a) to inventory their existing hospitals, to survey the need for construction of hospitals, and to develop programs for construction of such public and other non-profit hospitals as will, in conjunction with existing facilities, afford the necessary physical facilities for furnishing adequate hospital, clinic, and similar services to all their people; and (b) to construct public and other non-profit hospitals in accordance with such programs".

The hospitals may be general, tuberculosis, mental, chronic disease, and other kinds, but institutions which furnish domiciliary care primarily are excluded. Funds may be granted for the construction of public and non-profit hospitals, for public health centers, and related facilities such as laboratories, outpatient departments, nurses' homes, training facilities, and clinics.

In administering the program, the Public Health Service is assisted by a Federal Hospital Council and by several advisory committees. The Council consists of eight members, four outstanding in hospital and health activities, and four representing consumers of hospital services, to whom Congress has given certain administrative authority. It approves regulations under the Act, and if a State plan is disapproved by the Surgeon General, the Council, as an appeal body, may overrule the initial decision. This provision sets a new precedent in our country; and we are waiting with interest to see how it works out in practice.

I should like to emphasize the fact that our hospital program is primarily one of State and community responsibility. Our tradition of State sovereignty underlies the administration of the Hospital Act. In each State there is an Advisory Council composed of private citizens, representing both the professions and the consumers of hospital services.

Survey and planning funds are allotted to the States on a population basis; construction funds, on the basis of population and per capita income, with the formula weighted so that the States with low per capita income will receive a larger share of Federal money. Each Federal dollar must be matched by two State or local dollars for both survey and construction activities.

Though the Hospital Act is a major step forward in health legislation, it has certain limitations. Under the matching formula, the needier areas may not be financially able to provide the required two-thirds of construction costs, or to give the necessary assurance of financial ability to maintain and operate their facility once it is built. Moreover, because of rising construction costs, the total funds authorized, substantial though they are, will provide only about

20 to 25 per cent of needed additional facilities, according to recent estimates.

In spite of these shortcomings, the Act certainly will bring more hospital and health facilities within reach of more people. It will also go a long way toward setting up a national network for the more effective teaching and practice of modern medicine and its allied sciences.

The emphasis on decentralization in the hospital program has helped bring into sharper focus the problem of strengthening local public health services. Even with generous assistance from State and voluntary agencies, the traditional units of cities, counties, towns, and townships are not always able to afford public health services of a quality and scope consistent with present medical and scientific knowledge. Therefore, some of the local jurisdictions are pooling their resources, thus obtaining one effective operating health department which serves several communities. Since such consolidation eliminates expensive duplication of personnel and facilities, and the expenses are spread over a larger section of the population, the cost to each participating unit of government ultimately is reduced.

One reason for renewing the drive for more adequate local health services and for increased efficiency in administration is the extension of our concepts of public health, and the corresponding expansion of functions. More and more, we recognize the truth of a profound statement made by Dr. Winslow in 1926: that "the attempt to fix the boundaries of the public health program by establishing a distinction between prevention and cure must lead only to confusion and incertitude".

A recent example in the United States of the extension of public health functions is the passage, in 1946, of the National Mental Health Act. Its purpose is "to improve the mental health of the nation". It paves the way for a nation-wide program of prevention, comparable to preventive programs being carried on in other fields. It covers three broad phases of the mental health problem: research, training, and mental health services in local communities.

To aid research in mental and nervous diseases, we are authorized to make grants-in-aid to universities, laboratories, and individuals. The Act further authorizes the construction of a National Institute of Mental Health in the Washington area. In it, a full-time staff and advanced students will conduct investigations, and coordinate nation-wide efforts to advance our knowledge of mental illness. To promote training of personnel, training stipends will be given to students and grants will be made to public and other non-profit institutions to improve or develop their psychiatric training facilities. Finally, we are empowered to aid the States in providing mental services in the community. Our hope is that every community will ultimately be served by an all-purpose mental hygiene clinic fully staffed, and able to provide much-needed mental health services and education. At the request of the States, we may set up demonstrations, which will help establish psychiatric clinics and other mental hygiene facilities.

Our Congress is now in the process of authorizing the appropriation of three million dollars for grants to the States, to aid them in establishing mental

health services in local communities. The States may also use these funds for training purposes, in order to provide the personnel needed to carry out community services. In addition to the State grants, $4,500,000 is authorized for research and training purposes, including the undergraduate and postgraduate training of psychiatrists, and the postgraduate training of psychologists, psychiatric nurses and psychiatric social workers.

The concept of mental illness as a public health problem is of great significance to the well-being of our nation. Acceptance by the Federal government of responsibility in the field of mental health means our first opportunity for attack on this problem on a comprehensive scale, and for a broad, intensive program of prevention.

With the establishment in 1937 of the National Cancer Institute, cancer research was added to the domain of public health and funds are now being made available to help stimulate cancer control programs in the States. Although basic knowledge of the causation and prevention of cancer is lacking, it is agreed that we could save many lives—perhaps a third of our cancer patients—if we applied fully in every community all the knowledge we now have.

As a result of current interest, Congress is authorizing a notable increase in funds for the cancer research program of the Public Health Service. Funds also will be available to expand the physical facilities of private research institutions—hospitals and laboratories.

In recognition of the need for continuity in this difficult field, it has been stipulated that the money for cancer research will remain available until it is expended; thus, we are assured of continued support for prolonged investigations. In short, I may say that Congress has tried to bestow on the Public Health Service all of the legal provisions deemed necessary or desirable in dealing with the cancer problem.

There is full agreement among experts concerning the need for considerable breadth and scope in the immediate cancer research program. Studies are now being conducted in more than twenty directions; and the national program contemplates full coordination and integration of effort between public and private activities in scientific institutions.

Marked expansion of Federal activities also is taking place in other broad fields of medical research. To initiate and carry on studies in medical and public health sciences, we must have more trained personnel. Congress has recognized this need by providing funds for research fellowships, with stipends appropriate to the experience of the recipients. There are also traineeships available to less advanced research workers in the fields of cancer and mental health. Neither fellows nor trainees are under obligation to enter the Public Health Service or any other agency of the Federal Government. We are content in the knowledge that, wherever they work, the Nation as a whole will benefit.

Congressional authority permits the Public Health Service to conduct and promote investigations "relating to the causes, diagnosis, treatment, control, and prevention of the physical and mental diseases and impairments of man". The emphasis in these studies is shifting from medicine per se toward the

study of man himself, in relation to his total environment—physical, mental, sanitary, social. These investigations cover a vast range of sciences—almost as many as the forces which impinge upon man in his dynamic existence. Within the broad framework of Congressional authority, we include research in medicine, surgery, dentistry, antibiotics, bacteriology, biochemistry, nutrition, biophysics, cardiovascular diseases, endocrinology, gerontology, hematology, industrial diseases, malaria, pathology, pharmacology, physiology, neurology, psychiatry, psychology, cancer, venereal diseases, tuberculosis, tropical diseases, virus and rickettsial diseases, sanitation, and others.

Although we received authority to give grants-in-aid for general medical and scientific research in 1944, our war-time concerns prevented us from taking any considerable action until the past year. During the coming twelve months, about five million dollars will be available for outright research grants, in addition to the sums allocated for cancer and mental health investigation.

In order to carry out the varied administrative functions required for this comprehensive program, the Research Grants Division was established in our National Institute of Health, in January 1946. Guided by more than 250 leading American scientists, its projects are now under way in 21 principal areas of medical research. Grants are made by the Public Health Service to individual scientists and to institutions. Investigators may choose their own methods, and are required to make only such reports as will ensure wise and honest use of the public funds granted to them. To me, this policy symbolizes an ideal of government—namely, enhancing the opportunities of the individual without curtailing his freedom.

You will be interested to know that funds for research may be granted not only to institutions in the United States, but to those in other countries as well; and that we are not limited to the ranks of our own citizens in procuring the highly qualified specialists so important to these studies.

Three groups have been designated by the Congress to make recommendations to the Surgeon General for executing research programs. They are the National Advisory Health Council, the National Advisory Cancer Council, and the National Mental Health Council. A major function of these councils is to review applications for grants in their respective fields, and to make recommendations. As scientific leaders, they also survey the status of research in their respective fields, and urge competent workers to undertake research in neglected areas.

In embarking upon programs of such magnitude, we have two purposes in view: first, to give Federal support in expanding our knowledge of major health problems; and second, to intensify the action programs operated by States with Federal assistance.

These steps are fraught with certain dangers. In regard to research, our scientific potential has been seriously depleted by heavy wartime demands; and we may well be deficient in both physical facilities and resources of brain power, to conduct essential research on a scale expected by the public.

There are comparable hazards in our proposed action programs. In many communities, we lack the physical facilities and professional staff essential to

sound local health organization—to the basic structure required for even the traditional tasks of public health. And to establish and maintain effective programs in newer, more complicated action fields like cancer and mental health, we have even greater need for sound local health units.

A few years ago, I stated that, in my opinion, our greatest obstacles to progress in improving the national health were shortage of physical facilities and of personnel. The Hospital Survey and Construction Act represents a national policy; it sets a pattern for overcoming the first of these obstacles. As yet, we have given little thought to a national program designed to provide necessary personnel, although every field of medical and public health endeavor needs substantial numbers of men and women not now available. Only by taking decisive action to provide professional education in much greater volume can we hope to achieve the high standard of national health to which the people are entitled. This, in my judgment, represents urgent, unfinished business.

Conserving Mental Health in Canada

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CANADA has the opportunity of being one of the first countries in the world to make adequate provisions for the prevention and treatment of mental and nervous disabilities. This opportunity to contribute to leadership in the important field of mental hygiene is rendered possible because of such favourable circumstances as the following:

First—the existence of progressive departments of health in Canada (Federal, Provincial and local) that appreciate the significance of mental hygiene, that today are expending twenty million dollars per annum for mental health services, and that are prepared to enrich and expand their programs in this regard.

A second favourable factor is the discovery of the feasibility in Canada of developing co-ordinated programs involving the participation and partnership of mental hospitals, clinics, health units and schools for therapy and positive mental health endeavor.

A third factor of significance is the developing trend in Canada to look upon the mental hospital as we have known it in the past to be more or less obsolete, with the necessity of bringing about drastic changes involving the care of patients, and with a sharing of psychiatric responsibilities with general hospitals.

A fourth factor that can be capitalized upon in Canada is the possibility of developing as intimate a partnership between the general public and mental hygiene as exists today between the public and such health undertakings as activities in the fields of tuberculosis, cancer, infantile paralysis and blindness.

These four factors are worthy of more detailed discussion because of their potentialities in furthering mental health progress in this country.

1. Departments of Public Health in Canada Assume Wide Responsibilities in the Field of Mental Hygiene

We are indeed fortunate in Canada because of the circumstance that mental hygiene programs are being administered and developed by departments of public health. In this regard, undertakings have been assumed by the Department of National Health and Welfare through its Division of Mental Health. This latter division is active throughout the country in furnishing consulting services in the mental hygiene field, in sponsoring

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conferences of psychiatric leaders for the clearance of ideas and in contributing to public and professional education through radio programs, moving pictures and the distribution of mental hygiene literature. Provincial departments of public health in seven of our nine provinces are vested with the authority of administering public mental hospitals, together with institutions for mental defectives and epileptics. These provincial departments have, for the most part, appointed mental hygiene commissioners who are concerned with the development of broad programs in the fields of both therapy and prevention. Five provincial departments are administering community mental health clinics; three departments are initiating the plan of providing consultation services for general hospitals in connection with the neuroses and psychosomatic problems; two departments are organizing health units that include mental health services; and one department is directing special attention to alcoholics. Municipal departments of public health in several of our larger cities are providing mental hygiene services for school children.

This policy that is being followed in Canada, of including mental hygiene as an integral part of our broad programs in public health, is thoroughly sound and places the Dominion in a more favourable position to improve and extend mental health services than is the case in those countries wherein mental hospitals, clinics and preventive programs are administered as separate entities under a variety of boards that may or may not have any attachment to departments of public health.

Among the advantages that accrue through this partnership between public health and mental hygiene, there can be cited such worth-while benefits as the following:

First: The granting of encouragement and support to mental hygiene programs that have as their primary objective the prevention of mental and nervous disorders and the promotion of positive mental health. Stimulation of mental hygiene endeavor in this direction is assured when there is a close working relationship with medical officers of health and with other public health personnel who are engaged in the task of strengthening arrangements in all phases of preventive and social medicine. In other words, mental hygiene workers are bound to become imbued with the preventive point of view when there is team-play with public health colleagues who are shaping their chief efforts in the direction of prevention. And it will be discovered that preventive mental hygiene will be able, with advantage, to borrow and to adapt certain techniques that have proven value in the field of public health. As an illustration in this regard, there can be cited the public health procedures connected with sanitation. Now, just as sanitation is effective in protecting physical health, there are reasonable grounds for the assumption that the psychological sanitation of the environment would prove to be of great value in conserving mental health. Indeed, there are competent psychologists and psychiatrists in Canada who are prepared to conduct experimental demonstrations in the field of psychological sanitation.

A second advantage that comes through partnership between public health and mental hygiene is the strengthening of those aspects of public health work that are related to the prevention and treatment of physical

illnesses and disabilities. It is, of course, a well-established fact that psychological factors such as anxiety and emotional tensions may be significant in the aetiology of such physical conditions as tuberculosis, organic heart disease, gastro-intestinal disorders, rheumatic afflictions, accident proneness and other physical disabilities, and that psychological factors may determine in considerable degree the course, duration and outcome of these afflictions. Such being the case, there is need for a mental hygiene approach as well as a somatic approach in the fight against physical disabilities. This is another valid reason for team-play between public health and mental hygiene workers.

Among other advantages that accrue through this partnership is the circumstance that mental hygiene services can be extended by public health authorities to assist in meeting situations where the private practice of medicine is failing, by itself, to cope adequately with mental health problems. A good illustration of such a situation is the predicament in which we find ourselves today in Canada in regard to the neuroses. As we all know, the neuroses, or so-called nervous disorders, are as prevalent as the common cold. Every third patient who enters a doctor's office is afflicted. In pronounced forms the neuroses can be as disabling as the psychoses. Now this grouping of patients represents a serious threat to our national efficiency and constitutes a challenge of the first importance to medical science. To deal effectively with this large group of neurotic patients, it is necessary for practitioners of medicine to be well-trained in psychiatry and mental hygiene and to have the assistance of the consulting service of mental specialists. By and large, our medical practitioners are not well trained in psychological medicine and we have less than a hundred specialists throughout Canada who are available for consulting work. Because of this circumstance, the neuroses are being dealt with in a most ineffectual manner. Canadian medicine, that is so strong in many respects, is unfortunately weak in this particular branch of its work. Solution will be found in improving medical education, in placing more private psychiatrists in the field, and in enlarging public health programs to include the furnishing of consulting psychiatric services for general hospitals and for the medical profession. Plans can be evolved to obviate any competition between private practitioners of psychiatry and consultants who are employed by public health departments. Here is an opportunity to improve health in Canada that is made possible because of our policy of including mental hygiene as an integral part of our public health arrangements.

2. Co-ordinated Mental Hygiene Programs in Canada for Therapy and Prevention

Our prospects in Canada for the strengthening of mental hygiene work are not only enhanced by our policy of partnership with public health, but also by the trend that is developing in this country of co-ordinating therapeutic and preventive mental hygiene activities into one integrated program. In adopting this plan we are breaking away from the traditions of the past, wherein there was little interplay between the activities of mental hospitals, of mental hygiene clinics and of positive mental health programs in health units and in schools. Each one of these activities suffered when they were

deprived of the opportunity for close collaboration. Mental hospitals, for example, were left in a state of isolation, and this is one reason why these institutions have experienced great difficulty in recruiting staffs, in improving the efficacy of their services, and in winning the confidence of the public. Such isolation of the mental hospitals is unwarranted because members of the staffs of these institutions are eager to participate, on a part-time basis, in community programs and they have much to contribute in this regard. And it should be borne in mind that if these mental hospital staffs are not given an opportunity to share in community work, there is the tendency for the staffs themselves to deteriorate. They lose a sense of perspective in their work. Like their patients, they become institutionalized and the efficiency of the hospitals with which they are connected, is placed in jeopardy.

Now the plan of co-ordinating mental hygiene efforts has been instituted in several of our Canadian provinces. In one Western province, the mental hospitals have assumed the responsibility of providing training-courses in mental hygiene for public health nurses, for social workers and for school teachers. These hospitals, in collaboration with clinics, furnish training for these community workers in history-taking, in the gaining of an understanding of mental hygiene principles and in actual participation in the treatment of maladjusted individuals. As a result of their training, these community workers return to their respective jobs better equipped for their tasks and more alert to play their part in mental health conservation. The mental hospitals, by furnishing this training service, in addition to the meeting of other obligations, are placed in a position of energizing community mental health programs and of being viewed by the public, not as custodial asylums but as centres for mental health endeavour with great possibilities for contributions in the public health field.

Another illustration in Canada of team-play in mental hygiene is furnished by a western province wherein a mental hygiene clinic has co-operated with a rural health unit in developing a partnership with the schools of the district for constructive work in the domain of positive mental health and of prevention. This illustration is of interest because of its implications for the development of a nation-wide program for the safeguarding of the mental health of children. For many years, we have been conscious of the fact that, while mental hygiene clinics can do much by themselves to assist maladjusted individuals, they require a close working partnership with our schools for the conduct of work that is truly preventive in nature. This partnership has been attained in the Sturgeon Lake Rural Health Unit in Alberta, through the appointment of a man, well-trained in both pedagogy and mental hygiene, who acts as the necessary connecting link between the clinic and the schools. This man enters every classroom in his district. He studies the developmental history of every child. With every teacher he discusses the emotional and social needs of the children in the classroom. With the children themselves he conducts classes in human behaviour and human relations. He gives leadership in the training of parents in child rearing. In all phases of his work he maintains close contact with the mental hygiene clinic, with the medical officer of health, with public health nurses and social workers, and with

specialists in nutrition and pediatrics. This Sturgeon Lake Demonstration furnishes a desirable pattern for mental health undertakings for the whole province of Alberta and, in my opinion, for the entire country.

3. Recognition in Canada of the Needs for Drastic Changes in the Treatment and Care of Psychotic Patients

In addition to partnership with public health and the development of integrated programs between therapeutic and preventive services, there is a third factor in Canada that is contributing to mental hygiene progress. This factor relates to the circumstance that there is a growing body of sentiment among the general public and psychiatrists alike in favor of drastic changes in our methods of dealing with individuals afflicted with the psychoses. A great many people in Canada are critical of the policy of developing huge mental hospitals for the treatment of acute, recoverable cases of mental illness and of providing care in these institutions for large populations of chronic patients, including the aged, for whom active treatment may have only limited values. It is argued that patients with a good prognosis should be placed in well-organized psychiatric divisions of general hospitals or in self-contained active treatment units attached to mental hospitals but with no intermingling with the chronic and infirm. Existing arrangements are criticized on the grounds that the level of care for chronics, who comprise 70 per cent of mental hospital patients, is carried over in some measure to the treatment of new incoming patients, with the result that recoveries are jeopardized.

Our mental hospitals are also receiving adverse criticism because of overcrowding, understaffing and the utilization of many attendants and nurses who act as benevolent guards and custodians rather than as psychiatric workers who are assisting their patients towards higher levels of adjustment.

This dissatisfaction with mental hospitals is paving the way in Canada for far-reaching changes and advances. The policy has been accepted in several provinces of developing psychiatric divisions for acute cases of mental illness in general hospitals, and as separate units in connection with mental hospitals. In one Western province (Saskatchewan) the plan has been adopted of recruiting and training a new type of hospital personnel, who, with the assistance of psychiatrists, psychologists, occupational therapists, recreational therapists and others, will be engaged in active treatment and training programs. There is also the beginning of a trend to split up chronic populations in mental hospitals into various groupings with arrangements for more wholesome and interesting living than has been the case heretofore. In this connection there should be mentioned agricultural colonies, the boarding-out of patients in private families, and the organization of attractive units for the aged. An obvious next step will be the development of workshops for sheltered remunerative employment.

The statement can be made that the mental hospital as we have known it in the past is obsolete, and that moves are being taken in Canada at the present time to replace a worn-out system with arrangements that are more in line with the spirit and outlook of modern psychiatry and of our post-war civilization.

4. Possibility in Canada of Developing a Constructive Partnership with the General Public in Preventive Phases of Mental Health Work

A fourth factor in Canada that is contributing to mental hygiene progress is the widespread interest of the public in matters pertaining to mental health. This interest is being stimulated by psychiatric articles in the press and popular magazines, by radio dramatizations of the mental health approach to problems of human behaviour; and by moving pictures, presenting plays with plots suggested by psychiatric practice. Unfortunately, however, this interest of the public in mental hygiene has not as yet been directed into constructive channels that will result in the strengthening of mental health programs. To meet this serious deficiency, plans are now being formulated in Canada to give our citizens an opportunity to assist in the funding of preventive work with children in connection with programs that are sponsored by departments of public health. It is our aim, in mental hygiene, to secure as great a measure of constructive partnership with the general public as now exists between our citizens and such health undertakings as the fight against tuberculosis, against cancer, and against infantile paralysis. We realize the necessity, in Canada, of securing the backing, goodwill, and financial support of an understanding public, in connection with research and community mental health activities.

In conclusion, I would say that we have entered an era wherein mental health will be given as much prominence as physical health in our undertakings for human welfare.

Second Report on the Activities of the Committee on Joint Causes of Death

The United States Subcommittee of the International Conference for the Revision of the International List of Causes of Death

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AN INTERIM report (1) on the activities of the Committee on Joint Causes of Death, the United States Subcommittee of the International Conference for the Revision of the International List of Causes of Death, was presented to the Vital Statistics Section of the Canadian Public Health Association, meeting in Toronto on May 6, 1946. This Subcommittee, which is now referred to, by its short title, as the *U.S. Committee on Joint Causes of Death,* was formed in 1945 by the U.S. Department of State in compliance with the recommendations of the International Conference, at the Paris meeting in October 1938, which requested the United States Government to continue its investigations during the next ten years into the problems associated with joint causes of death, in cooperation with other countries and organizations. This assignment was carefully considered at the first meeting of the Committee which included representatives from the United States, Great Britain and Canada. It soon became evident that the problem of joint-cause selection (i.e. the selection, for the purpose of statistical tabulation, of the principal cause of death when two or more causes are stated on the medical certificate of death) could not be solved without considering first of all a suitable classification; and, in view of the increasing demand for an authoritative classification of diseases for morbidity statistics, the Committee decided that the preparation of a single statistical list suitable for coding causes of morbidity as well as of mortality should be undertaken at once. The proposed classification should follow the general framework of the International List of Causes of Death and must be ready for presentation at the next decennial revision conference.

Several meetings of the U.S. Committee have been convened in Washington, D.C., viz. in December 1945, February 1946, October 1946 (New York), February 1947 and April 1947 (Ottawa), and have been devoted almost entirely to the prime objective, i.e. the compilation of a proposed statistical classification of diseases, injuries and causes of death. As the detailed work proceeded, it

Presented before the Vital Statistics Section at the thirty-fifth annual meeting of the Canadian Public Health Association, held in the Château Frontenac, Quebec, May 20-22, 1947, in conjunction with the Conference of State and Provincial Health Authorities of North America.

became evident that new members and consultants should be added to secure wider representation, so that in the autumn of 1946 the final group included twenty members, with Dr. L. J. Reed, Vice-President of the Johns Hopkins University, as Chairman; Dr. H. L. Dunn, Chief of the National Office of Vital Statistics, United States Public Health Service, as Secretary for the *Mortality Code;* Dr. S. D. Collins, Senior Statistician, United States Public Health Service, as Secretary for the *Morbidity Code;* Drs. G. Baehr, E. L. Crosby, P. M. Densen, H. F. Dorn, Thurber Fales, E. S. Rogers, R. L. Ware and Mr. E. L. Hamilton from the U.S.A.; Mr. J. T. Marshall, Dominion Bureau of Statistics, Drs. F. S. Burke, J. C. Meakins and J. Wyllie from Canada, with Miss W. O'Brien as adviser to the Canadian members; and four consultants—Drs. Y. M. Biraud, Deputy Secretary of the Interim Commission of the World Health Organization, Geneva, I. M. Moriyama, U.S.P.H. Service, Washington, D.C., A. H. T. Robb-Smith, Secretary, M.R.C. Committee on Hospital Morbidity Statistics, Oxford, and Percy Stocks, Medical Statistician, General Register Office, London, England. The members of the Committee were aided very materially by the efforts of an active group of eight members—Drs. Dunn, Biraud, Collins, Thurber Fales, Moriyama, Robb-Smith, Percy Stocks and Miss O'Brien—selected to act as a Subcommittee* on Classification of Diseases, Injuries and Causes of Death. The laborious task of compiling a classification to serve the dual purpose of coding causes of morbidity and mortality was eagerly undertaken, and involved intensive work in daily sessions from December 10, 1945 to February 11, 1946. A preliminary draft of a *Proposed Statistical Classification of Diseases, Injuries and Causes of Death,* prepared in this way, was subjected to close study and critical examination by all members of the Committee and later submitted to several agencies in Great Britain, the United States and Canada for experimental trial. As a result of this scrutiny, modifications have been made and suggestions incorporated in the classification. The work embraces the compilation of three sections—Part I, *Introduction and List of Categories;* Part II, *Tabular List of Inclusion Terms;* and Part III, *Alphabetical Index to the List.* A final draft of Part I was approved at the Ottawa meeting on March 10, 1947. A tentative edition of Part II, which was issued for trial coding in August, 1946, by the U.S. Committee on Joint Causes, was revised at the Ottawa meeting for distribution to the members of the International Committee. Part III, the alphabetical index, is in course of preparation.

Effect of Post-war, International Developments on the Work of the U.S. Committee

While work on the proposed classification was in progress, international developments at the conclusion of World War II have created a new situation for the Committee. It may be recalled that the U.S. Committee on Joint Causes of Death was formed in 1945 in fulfilment of the request made by the Fifth Decennial Revision Conference in 1938 to the United States Government. The

*Formerly called the Interim Committee in First Report.

function of this Committee was to submit recommendations at the Sixth Decennial Revision Conference, expected to be convened in 1948.

As a result of the International Health Conference held in New York during June - July 1946 under the auspices of the United Nations, a World Health Organization was formed and an Interim Commission appointed. Under Article XIII, entitled Statistical Services (2), of the Articles of Agreement between the United Nations and the World Health Organization, the World Health Organization was recognized as the *appropriate* agency for the collection, analysis, publication, standardization, dissemination and improvement of statistics within its special sphere. To the Interim Commission there have been transferred the health functions of the League of Nations' Health Organization and certain functions of UNRRA and of the *Office International d' Hygiène Publique*. At its second session in Geneva in November 1946, the Interim Commission authorized the appointment of a Committee on Revision of the International List of Causes of Death and the Establishment of International Lists of Causes of Morbidity (3). It was decided therefore that the work done by the U.S. Committee should be made available to the International Committee appointed in January, 1947, by the Interim Commission of the World Health Organization.

The members of the International Committee include: Drs. Julia E. Backer, Oslo, Norway; S. T. Bok, Leiden, Netherlands; D. Curiel, Caracas, Venezuela; W. Thurber Fales, Baltimore, U.S.A.; R. H. Hazemann, Paris, France; M. Kacprzak, Warsaw, Poland; P. Stocks, London, England, and J. Wyllie, Kingston, Canada; with Drs. S. D. Collins, Bethesda, U.S.A., and H. L. Dunn, Washington, D.C., as rapporteurs for the U.S. Committee, Dr. A. H. T. Robb-Smith as rapporteur for the British Medical Advisory Committee and Dr. M. Cakrtova, Geneva, Switzerland, and Mr. J. T. Marshall, Ottawa, Canada, as secretaries.

Accordingly an unique and historic occasion presented itself when the U.S. Committee met in Ottawa at the time of the First Session of the International Committee of the Interim Commission of the World Health Organization. At a combined meeting of these Committees, held on March 11 and 12, 1947, Mr. H. Marshall, Dominion Statistician, introduced the Honourable J. A. MacKinnon, Minister of Trade and Commerce for Canada, who extended a welcome on behalf of the Canadian Government to the members of both Committees meeting in Ottawa for the purpose of preparing recommendations to the International Conference for the Sixth Decennial Revision of International Lists of Diseases and Causes of Death, and wished success to their efforts. Dr. Percy Stocks, Chairman of the International Committee, indicated that the purpose of the combined meeting was to secure information on the present status of the Proposed Statistical Classification of Diseases, Injuries and Causes of Death as prepared by the U.S. Committee. In his reply Dr. L. J. Reed, Chairman of the U.S. Committee, expressed satisfaction with the work of his Committee and Subcommittee and his pleasure in being able to transmit Parts I and and II of the Classification to the International Committee. He intimated also that the Subcommittee had been authorized to continue with the International Committee in the further study of Part II, which was being transmitted in a provisional form.

Activities of International Committee in Joint Meetings with the U.S. Committee

(a) The International Committee met jointly with the U.S. Committee on Joint Causes of Death on March 11 and 12, 1947, and reviewed Part I—*Introduction and List of Categories*—of the *Proposed Statistical Classification* which had been developed by the U.S. Committee and approved at its meeting on March 10, 1947. The International Committee realized the enormous help of having this volume as a convenient working basis and the advantage of joint meetings of both Committees in affording an exchange of views and discussion between members.

In the proposed classification certain new features in the arrangement and content of the groups from those of the Fifth Revision of the International List of Causes of Death may be noted.

1. *Senility and Ill-defined Conditions* have been combined in a single section (XVI); hence there are 17 main sections in the classification as compared with 18 sections of the Fifth Revision. Section XVI contains a number of new categories classifying undiagnosed conditions according to symptoms, e.g. symptoms referable to the nervous system, respiratory system, etc., and will be useful in classifying morbidity data when an accurate diagnosis is not recorded.

2. Section V, *Chronic poisoning and Intoxication,* has been replaced by *Mental, Psychoneurotic and Personality Disorders.* Conditions included in the three groups of Section V of the Fifth Revision are assigned elsewhere in the new classification.

3. The preparation of a single code for morbidity and mortality records of Accidents, Poisonings and Violence presented difficulties because of the axes of reference of statistical interest, namely by *nature* of injury and by circumstances of accident or *means* of injury. Morbid conditions resulting from injuries, poisonings and other external causes are classified according to the *nature* of these conditions and are incorporated in Section XVII. A Supplementary or Alternate Classification by external cause is also provided, the code numbers being preceded by the letter E.

4. The transfer of certain conditions from their position in previous International lists was considered necessary in accordance with developments in medical science. The following examples are of interest:—

(1) Influenza includes a large group of indefinite and poorly defined infections of the upper respiratory tract as well as illness and death from acute bronchitis and pneumonia. Consequently, diseases of the pharynx formerly included in Section IX, *Diseases of the Digestive System,* and Influenza formerly in Section I, *Infective and Parasitic Diseases,* are transferred to the first part of Section VIII, *Diseases of the Respiratory System.* In this way all important minor and severe illnesses of the respiratory system excluding respiratory tuberculosis and pulmonary neoplasms are brought together in the code.

(2) Rheumatic fever and its early cardiac manifestations are transferred from Section III to Section VII, *Diseases of the Circulatory System,* so that acute heart conditions precede chronic heart conditions of

rheumatic origin. In the same section, conditions arising from arterial hypertension, except those affecting the C.N.S., are brought together in a single group designated *Hypertensive Disease* (44). This group also includes arteriolar nephrosclerosis, formerly placed under *Diseases of the Kidney.*

(3) The treatment of food poisoning shows a radical change, only mushroom and shellfish poisoning remaining in Section XVII, *Accidents, Poisonings and Violence.* Salmonella infections, including those associated with food poisonings, are grouped under *Paratyphoid Fever and Other Salmonella Infections;* staphylococcal food poisoning has been allocated to the group entitled *Streptococcal Diseases, Bacterial Septicaemia and Toxaemia;* botulism is placed under *Other Bacterial Diseases;* and the large group of food poisoning of unstated cause is assigned to the group of *Infectious Diseases Commonly Arising in the Intestinal Tract.* These four groups are found in Section 1, *Infective and Parasitic Diseases.*

(4) The late effects of disease and injury may be classified *either* according to the original disease or injury initiating the present morbid condition *or* to the existing disability necessitating treatment. Both methods have been provided for in the classification, so that a choice is available to the statistician.

The importance of developing abbreviated lists of categories in addition to the detailed list, their usefulness for special statistical tabulations and their adoption to secure international comparability of specific rates were emphasized by Dr. Dunn. A subcommittee, consisting of Drs. Bok, Burke, and Moriyama, was entrusted with the preparation of an *intermediate* list of 150 selected categories for international tabulation of diseases and causes of death by *demographic* characteristics and an *abridged* list of 60 selected categories for *geographic* areas. Preliminary drafts of these lists were submitted to the members of the International Committee for their private study so that suggestions may be considered at the next session in September, 1947.

(b) The International Committee also met jointly with the U.S. Subcommittee on Classification of Diseases, Injuries and Causes of Death, in daily sessions from March 12-21, 1947. Considerable time was devoted to discussions, often in minute detail, of Part II—the *Tabular List of Inclusion Terms,* i.e. the diagnostic terms to be included in each category of the classification. The foundation of this tabular list was laid by the members of the U.S. Subcommittee on Classification working in the United States, Great Britain and Canada and making use of the national manuals of the Fifth Revision of the International List and many other sources of information. A tentative edition of the Tabular List was issued in August 1946 and was subjected to an exhaustive examination by the Medical Advisory Committee for the Sixth Revision of the International List in Great Britain. The amendments and additions proposed by specialists of the British Committee and by experts in Europe, the United States, Canada and elsewhere have been carefully considered by the International Committee and incorporated as far as possible in a revised volume which was published by the Interim Commission of the World Health Organization in April 1947. The

inclusion in the Tabular List of all terms likely to appear on medical records of illness, injury and death is neither possible nor practicable, but an attempt was made to show most of the diagnostic terms which are employed more or less frequently and those commonly causing difficulties in coding. Obsolete, unsatisfactory and infrequent terms, which it was considered advisable to exclude from the Tabular List, were relegated to the Alphabetical Index.

During the course of these detailed discussions, Latin terms such as Struma (goitre), Aleukia splenica (splenic leukaemia), Peliosis rheumatica (purpura), etc., came under review. Drs. Bok and Backer made a plea for the inclusion of Latin equivalents in the English edition of the list, similar to those included in the French edition of the Fifth Revision of the International List, as many European doctors are accustomed to use Latin terms in their medical records. It was decided to invite Drs. Bok and Backer to prepare a list of Latin equivalents of the terms in the Tabular List for presentation at the second session of the International Committee.

The Committee gave consideration to the need for a common English Manual of the International List but technical difficulties were involved in the preparation of an introduction to the list itself, an explanation of the rules of certification for the guidance of doctors and a statement of the principles of selection of joint causes of death. However, an international version in English of the full document—Parts I, II and III of the International Statistical Classification—has been decided upon and this will be translated subsequently into French and Spanish. On the basis of one of these three versions, it should be possible for each country to prepare a suitable national manual, including medical terms in use in its own country, without distorting the content of the categories.

At the conclusion of the detailed study of Part II, the *Tabular List of Inclusion Terms,* the International Committee decided that the highly technical work of preparing an alphabetical index should be entrusted to those agencies, in the United States and Canada, with experience in this type of compilation. A subcommittee, consisting of Dr. S. D. Collins, Dr. I. M. Moriyama, Mr. J. T. Marshall and Miss W. O'Brien, has been entrusted with the tedious and painstaking duty of compiling an Alphabetical Index to the List. The arrangement, assignment and compilation of all the terms included in the *Tabular List of Inclusion Terms* involves extreme patience, technical skill and strict attention to detail. The International Committee hopes to receive a report of this subcommittee at its next session.

On the basis of its work in joint sessions with the U.S. Committee on Joint Causes of Death and the U.S. Subcommittee on Classification of Diseases, Injuries and Causes of Death, the International Committee submitted the following proposals to the Interim Commission of the World Health Organization. These were: (a) submission of Part I— *Introduction and List of Categories*—of the International Statistical Classification of Diseases, Injuries and Causes of Death to governments with the recommendation that this classification be adopted as a basis for the Sixth Decennial Revision of the International List of Causes of Death; (b) further study of Part II—*Tabular List of Inclusion Terms*—by participants of the Ottawa session; (c) use of Part II as a basis for the prepara-

tion of an Alphabetical Index by a technical subcommittee; (d) early translation of Part I into French and Spanish and (e) further consideration of Drafts of the Intermediate and Abridged Lists by participants of the Ottawa session.

Already, the International Statistical Classification has received the sanction of the Interim Commission of the World Health Organization. A French translation has now been prepared and a Spanish version will be published shortly. The classification will be made available in one of the three versions for distribution to the 61 different countries signatory to the Constitution of the World Health Organization. It is hoped that at the next session of the International Committee suggestions and criticisms will have been received so that a final document can be prepared for submission at the Sixth Decennial Conference, expected to be convened in Paris, in June 1948.

Recommendations of the Subcommittee of the Canadian Public Health Association on Revision of International List of Causes of Death

The Canadian Public Health Association's Subcommittee on Revision of International List of Causes of Death makes three recommendations for action by the C.P.H.A. Committee on Nomenclature and Nosology: (1) That the latter Committee be instructed to proceed with its consideration of the List of Categories of the International Statistical Classification of Diseases, Injuries and Causes of Death as prepared by the Interim Commission of the World Health Organization, with a view to submitting the recommendations of the Canadian Public Health Association for the advice and guidance of the Medical Advisory Committee to the Dominion Statistician. (2) That the Committee be directed to confine its suggestions to the basic principles of the International Statistical Classification, leaving the arrangement of individual categories to the International Committee of medical experts, appointed by the Interim Commission of the World Health Organization. (3) That the Committee be empowered to frame proposals for submission to the Medical Advisory Committee without prior reference to the Vital Statistics Section of the Canadian Public Health Association, on the understanding that a report on all the activities be presented at the next meeting of the Section.

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The Ascorbic Acid Content of Some Foods Commonly Used in Canada

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IN recent years much attention has been focused on the importance of an adequate intake of the various known nutrients for the maintenance of health. Because the nutritional content of foods is not widely known by the general public, the tendency has been to supplement the dietary intake with vitamins and minerals in concentrated form. Such a plan of treatment has one great disadvantage. It shifts emphasis from foods which contain the known nutrients and probably other unknowns, to tablets or capsules which contain, frequently in synthetic form, a few of the best known nutritional factors.

It is the purpose of this report to discuss the supply of one of the nutrients required, namely vitamin C, from the viewpoint of its content in commonly used Canadian foods. The daily intake of ascorbic acid recommended by the Food and Nutrition Board (1) of the National Research Council, Washington, and the Canadian Council on Nutrition is 70-75 mgs. per day for adults. Recently, however, the Canadian Council on Nutrition (2) adopted the following statement: "Ascorbic Acid. Average intakes of ..... 50 mg. per day for adults appear to be sufficient". In the United Kingdom most investigators feel that these figures are high and that only 25-40 mgs. per day are required. It is difficult to demonstrate clinical differences in individuals receiving 20-25 mgs. of ascorbic acid daily, which will protect from scurvy, and the 50-75 mgs. recommended on this continent. Work recently completed in Canada (3) indicates that, after local treatment to clear up the clinical evidence of gingivitis as completely as possible, recurrence of the inflammation occurs more rapidly on a diet containing 10 mgs. ascorbic acid daily than on one containing 75 mgs., and there is a suggestion in the same study that 25 mgs. ascorbic acid daily protects against recurrence of gingivitis to a lesser degree than 75 mgs.

Considerable time and study will probably be required before an exact definition of the required ascorbic acid intake for the average individual is available. In the interim, while 75 mgs. daily may be somewhat higher than the final figure chosen, it probably represents a safe level of intake. In this country where it is usually possible to obtain 75 mgs. daily, it seems advisable to retain this standard until further light is shed on body requirements.

In the control of food in the Royal Canadian Air Force, an attempt was made to supply 75 mgs. of ascorbic acid per day. In order to determine the actual amount provided, laboratories were established to assay the food as served to R.C.A.F. personnel. In addition to the prepared foods, certain raw

foods were assayed for their ascorbic acid content. The method was a modification of that of Evelyn, Malloy and Rosen (4), developed by S. H. Jackson, Hospital for Sick Children, Toronto. It is essentially the 2-6 dichlorophenol-indophenol method, using a photo-electric colorimeter.

This paper reports certain of the findings of these laboratories. It is divided into two parts: (1) the average ascorbic acid content of commonly used Canadian foods and (2) seasonal variation in the ascorbic acid content of vegetables commonly used in Canada.

The Average Ascorbic Acid Content of Commonly Used Canadian Foods

The results showing the number of assays performed and the average ascorbic acid content of a number of foods ordinarily consumed in Canada are shown in Table I.

TABLE I

AVERAGE ASCORBIC ACID CONTENT OF FOODS USED IN CANADA

Commodity	No. of Assays	Ascorbic Acid (mgs. per 100 gms.)
Fruits and Fruit Juices		
Apples	58	5.3
Apple Juice Fortified, canned	249	38.9
Crab Apples	7	19.6
Cherries	3	10.5
Grapefruit, fresh	20	42.4
Grapefruit, canned	4	19.2
Grapefruit Juice, canned	313	32.7
Jam, Strawberry	3	1.7
Marmalade, Orange	8	3.2
Lemons, fresh	22	50.2
Oranges, fresh	161	52.4
Orange Juice, concentrated	4	168.0
Tangerines	7	29.3
Tomatoes, fresh	59	18.7
Tomatoes, canned	368	17.0
Tomato Juice, canned	260	15.0
Tomato Ketchup	11	16.3
Pears, canned	5	1.4
Vegetables		
Cabbage	579	59.2
Carrots	109	4.9
Cauliflower	3	72.9
Celery	19	6.2
Corn, canned	9	3.4
Cucumbers	6	15.5
Lettuce	49	9.6
Onions	151	9.9
Parsnips	78	15.7
Peas, green	8	35.4
Peas, canned	10	6.7
Peppers, green	4	98.6
Potatoes, white	326	16.2
Potatoes, sweet	5	22.5
Pumpkin, canned	9	5.3
Radishes	34	31.9
Spinach	3	65.8
Turnips	242	42.7
Miscellaneous		
Liver, raw	3	25.4
Milk, fresh, pasteurized	4	0.8

It is obvious that, when the factor of economy does not enter into the purchase of food, an intake of 75 mgs. ascorbic acid per day presents little or no problem. Oranges, grapefruit and grapefruit juice supply relatively large

quantities of ascorbic acid. The cost of these commodities is often so high that, for families in poor economic groups, this source may be prohibitive. Canned tomatoes and tomato juice are considerably cheaper, from one viewpoint, but contain only one third to one half as much ascorbic acid as the citrus fruits and their juices. Nearly 15 ounces each day must be consumed, according to these assays, to achieve an intake of 75 mgs. ascorbic acid. It is interesting to note that Johnstone (5), investigating the vitamin C content of citrus fruit and vegetable juices available in retail stores in Toronto, found that canned grapefruit juice averaged 36.4 mgs. per 100 gms. and it furnished 17.4 mgs. at a cost of one cent, whereas canned tomato juice contained 14.0 mgs. per 100 gms. and supplied 8.3 mgs. for one cent.

The great bulk of the ascorbic acid ingested by families in poor circumstances must come from vegetables which, because of their low cost, commonly make up a large part of each day's food. The vegetables which are most important in the supply of this nutrient throughout the year are potatoes, cabbage and turnips. The ascorbic acid content of raw cabbage and turnips, on the average, is in the range of that of the citrus fruits and juices, while that of raw potatoes is in the range of tomatoes or tomato juice. Although it must be recognized that cooking may entail rather heavy loss of ascorbic acid from these vegetables, they are of paramount importance in view of the amounts in which they are usually consumed.

Seasonal Variation in the Ascorbic Acid Content of Vegetables Commonly Used in Canada

In attempting to obtain an adequate intake of ascorbic acid from potatoes, cabbage and turnips, one must bear in mind the variations in ascorbic acid content which occur throughout the year. The R.C.A.F. Nutritional Laboratories assayed certain raw foods obtained from the messes situated across Canada from 1943 to 1945 inclusive. For this reason, the results do give a picture of the ascorbic acid content of these three common vegetables as obtainable in various months of the year throughout the country. These assays are shown in Table II.

TABLE II

SEASONAL VARIATION IN THE ASCORBIC ACID CONTENT OF VEGETABLES

	POTATOES		TURNIPS		CABBAGE	
	No. of Assays	Ascorbic Acid (mgs. per 100 gms)	No. of Assays	Ascorbic Acid (mgs. per 100 gms)	No. of Assays	Ascorbic Acid (mgs. per 100 gms)
January	50	11.8	26	44.6	25	58.4
February	21	12.5	22	43.7	21	53.8
March	20	10.7	27	43.1	31	50.5
April	24	9.7	24	40.6	24	53.9
May	27	10.3	25	40.9	18	53.7
June	21	10.6	18	37.2	16	56.5
July	21	12.5	12	37.8	42	55.0
August	25	27.3	12	43.0	48	49.0
September	17	29.2	17	44.1	64	46.8
October	41	26.3	11	47.8	196	67.4
November	43	17.3	32	40.3	64	66.6
December	16	13.9	16	48.9	20	65.3

There is a marked seasonal variation in the ascorbic acid content of potatoes. A precipitous drop occurs during the month of November, followed by a gradual decrease. One would have to consume from two to three times the quantity of potatoes which have been stored over the winter as of recently harvested potatoes in the autumn to obtain the same amount of ascorbic acid.

In contrast, there is little variation throughout the year in the ascorbic acid content of the cabbage and turnips available in Canada.

Obviously this seasonal variation in the ascorbic acid content of potatoes is the result of storage after harvesting. In the case of cabbage, this vegetable is not stored for as long a period as potatoes. The growing and harvesting of cabbage is extended throughout most of the summer and fall, and in the winter months fresh cabbage is imported in some quantity. It is realized that the ascorbic acid in cabbage may be more stable.

Turnips, like potatoes, are harvested in the fall of the year. However, it is possible that the waxing of turnips before storage, which is common practice for most commercial varieties, is a factor in the conservation of ascorbic acid.

Summary

The average ascorbic acid content of some fruits, fruit juices and vegetables, commonly used in Canada, is reported.

The seasonal variation in the ascorbic acid content of potatoes, turnips and cabbage as determined from supplies available across Canada throughout the year, is shown. This seasonal variation is present to a marked degree in the case of potatoes.

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Since the preparation of this paper, the brochure entitled "A Survey of the Ascorbic Acid Content of Fruits, Vegetables and Some Native Plants Grown in Ontario, Canada" by J. H. L. Truscott, W. M. Johnstone, T. G. H. Drake, J. R. Van Haarlem, and C. L. Thomson, has been printed and distributed by the Department of National Health and Welfare, Ottawa, Canada, at the request of the Committee on Food Analysis, the Canadian Council on Nutrition. This work covers investigations of the ascorbic acid content of a number of fruits and vegetables commonly grown in Ontario and is result of work conducted by the Department of Horticulture, Ontario Agricultural College, Guelph, Ontario; Hospital for Sick Children, Toronto, Ontario; Horticultural Experiment Station, Vineland, Ontario; and supported by grants from the Nutrition Foundation, New York.

The Importance of Blood and Blood Fractions in Public Health

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PRIOR to and during the first World War any attempts at providing blood substitutes had been unsuccessful. During the succeeding two decades the use of whole blood in civilian medical practice increased tremendously. The armed forces, realizing the urgent need for the provision of whole blood and blood substitutes, requested the National Research Council to expand as rapidly as possible investigations for the development of these life-saving fluids. Considerable research had already been conducted by Professor Edwin J. Cohn and his associates at Harvard Medical School in the development of blood fractions and their biochemical characteristics. This work was accelerated through funds made available by the National Research Council and soon the military forces had the benefits of the development of specific methods for the fractionation of the various derivatives of blood. The Massachusetts Department of Public Health, through a special act of its General Court (1941), was authorized (through its Division of Biologic Laboratories) to cooperate with the Harvard Medical School in the development of these blood fractions. The work progressed rapidly and our military forces were soon supplied with plasma, later albumin, and finally whole blood. The life-saving value of these products is known to every physician. Through the development of these fractions and through the use of the antibiotics, the loss of life due to wounds was far less in World War II than ever in the history of warfare.

Realizing the value of blood and blood fractions in the saving of military personnel, realizing that more civilians were injured and died as a result of accidents in Continental United States than military personnel in our overseas forces who were injured and died of battle casualties during the same period of war, and realizing further the need of blood and blood fractions for the use of patients subjected to other medical ills and elective operations, the Department of Public Health concluded that plans should be developed, forthwith, for the provision of blood and blood fractions to the civilians of the

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Commonwealth. The necessary vision and planning that preceded, for a period of almost two years, any concrete measures taken in the development of this program, is illustrative of the complexity of such a project for the provision of whole blood and blood fractions on a larger scale.

Since the organization of the first state health department in the United States in 1869, Massachusetts has taken advantage of advances in medical and public health fields to make available to the public as soon as possible the benefits of new knowledge and techniques. It was the first state health department to supply antitoxin for the treatment of diphtheria and the first department to build a state tuberculosis institution and a state cancer hospital, and was first to initiate a cancer program. The history of Massachusetts is replete with leadership in the public health field. Although Michigan had been engaged in supplying blood plasma to its people, Massachusetts was the first state to have set up a program for the collection, processing and distribution of whole blood and various fractions of blood. At the present time we are distributing surplus blood plasma, gamma globulins and whole blood, and are fractionating other derivatives and laying up a sufficient store before actual distribution of these begins.

Adequate medical care in Boston and throughout the State is not possible without the proper supply of whole blood and blood derivatives. In 1943 approximately two pints of blood and its equivalent in plasma were used per hospital bed. In 1946 this increased to 4.2 pints and it is estimated that in 1947 the use of whole blood and blood plasma will average approximately 6 pints per bed per year. Thus, with the realization of the importance of blood and its various derivatives as an essential to good medical care, a program had to be formulated for providing these substances to the public. The cost to the patient of obtaining these products by purchase is, in most cases, prohibitive. Despite the efforts of hospital blood banks, not only has the cost of these products to the patient oftentimes been excessive, but supplies of whole blood have not been always available. Moreover, processing of fractions on a small scale is not only prohibitive in cost but technically impractical for such hospitals to undertake. However, through a non-profit organization working on the basis of a large population group, the cost of procurement, processing and distribution of whole blood and derivatives could be greatly reduced. Inasmuch as donations of blood would be expected from volunteers and since the work could be integrated with the manufacture and distribution of other biologicals already distributed free to the public, the Department of Public Health, after advice from the State Hospital and Medical Association, determined to undertake a program whereby it would supply whole blood and derivatives to the public free of charge.

Blood is a peculiar commodity and cannot be manufactured in a laboratory. It must be obtained by human donations. It was essential, therefore, to realize that only through a co-ordination of effort by the state health department and the medical and hospital professions would the public interest be aroused to active participation in the donation of blood. The most important phase of the program is not the processing or the distribution, or the regulations controlling

its use or manufacture, but rather the educational campaign necessary to maintain the active interest and participation of the public in the program. It thus becomes apparent to all that the program could not succeed unless sufficient numbers of volunteer donors were to be obtained.

In the early stages of our plans it was realized that the expense of such an extensive campaign would be great and that if we could obtain the co-operation of the American National Red Cross in the procurement of donors we would have the advantage not only of a great number of volunteers who could assist in this procurement but, at the same time, a group who have had experience in this field and who have already created favorable public reaction to the donation of blood for the use of servicemen. Therefore, early in the program, plans were made whereby the American National Red Cross through its local chapters would assume the responsibility for: (1) the initial campaign for soliciting donors on a community basis, (2) the procurement of donors and assignment of regular appointments, (3) the manning of bleeding clinics by volunteers, and (4) the provision of canteen services to donors.

The assistance of the Red Cross must be acknowledged as having saved a great deal of expense and having furthered the program of donor-procurement. Unfortunately, this donor-procurement must be accomplished only by concerted action on the part of all interested groups. The labor pains of our program were characterized by the collection of only about 50 per cent of our quota during the first year of operation (1946). This was due chiefly to an adverse reaction on the part of the public and some of the local Red Cross chapters, who felt that they had accomplished their all during the war and now could relax. It was due in part to a lack of appreciation on the part of other groups of the extensive work necessary to procure sufficient enrollment of donors.

We are now convinced that for a state such as Massachusetts, with a population of approximately 4½ million, the donor-procurement agency must consist of at least a physician, a publicity chairman, two chapter or community organizers and the necessary clerical staff employed on a full-time basis, in addition to the six General Field Representatives who devote only a portion of their time to Chapter organization for the procurement of blood donors. Too much emphasis cannot be placed upon the importance of building a comprehensive and solid program in relation to the procurement of blood. Periodic releases on the state level, and the provision of a manual of suggested releases, procedures and techniques to local chapters, should be essential. Constant advice and supervision both from the sponsoring procurement agency and the state health department are necessary. The public must have dramatized to it, in vivid manner, the need of depositing blood in a bank for their use in future emergencies. The appeal must be not only on an individual or family basis but on a community or state-wide basis.

During these early stages of our program, priority in the distribution of blood and blood derivatives has been given (1) to the families of persons who have donated in the past year, (2) to other residents of communities that have participated, and (3) to residents of communities which, as yet, have not made their contributions to the program. As soon as the procurement of blood from

donors becomes large enough to meet the demands, the priority system will probably be removed so that all citizens of the Commonwealth will be eligible for receipt of the products in any amount necessary.

It is not the intent of this presentation to discuss the therapeutic indications of blood and blood derivatives nor to extol the virtues of these products; rather, to describe to you the public health significance of a program designed to make these products available to the public. There are several problems which, from a public health aspect, must be considered. The first of these lies in the provision of a product which is safe, in that it does not contain organisms which may be a source of infection to the recipient. The selection of donors is therefore extremely important in the prevention and transmission of disease. This is done, in part, by the establishment and maintenance of standards for the selection of donors. The elimination of individuals who may transmit through their blood donations, virus diseases—notably infectious hepatitis—and the elimination of individuals (a large number of them servicemen) who could possibly transmit malaria through donations of blood, presented a significant problem which had to be met. Prevention of homologous serum jaundice by the regulation of the proper use of Rh typed blood presented another serious responsibility. The obvious possibility of syphilis transmission was eliminated by serological examination of blood samples of each specimen collected. These are but examples of safety measures which must be taken to ensure the collection of a safe product.

The second important problem concerns supervision of the collection and transportation of the blood to the laboratory. Our method was modeled after techniques used by the American National Red Cross and further developed so that, at present, all specimens are chilled immediately after bleeding and are transported in specially constructed refrigerator cases and reach the laboratory in less than twelve hours after collection.

All bleedings are performed under the direction and supervision of the Department and by departmental personnel. Plans are being devised whereby community hospital blood-bank bleedings may be utilized for fractionation. Such bleeding will be carried on by hospital personnel but will be, again, under the supervision and direction of the Department of Health.

The third important problem to be considered is the proper typing of blood. This has been accomplished by an on-the-spot slide-technique typing of the donor prior to the collection of his blood, and followed by a subsequent check by test-tube method at the laboratory from the serology specimen attached to each flask of blood. Thus, two typings, including the determination of the Rh factor, are made for each donation. The donor is furnished an identification card listing the date of donation, his blood group and Rh factor. Cross-matching of the donor's blood with the blood of the recipient remains the responsibility of the attending physician and is not assumed by the Department.

The fourth problem to be considered is concerned with the distribution of whole blood and blood fractions. This constitutes, in effect, two separate problems since the distribution of a short-lived product as whole blood or red cells is much more involved and complicated than that of the more stable blood fractions. The stable blood fractions are being distributed directly to all hospi-

tals by parcel post or express and can reach any hospital in the Commonwealth within 24 hours. In case of emergencies they may be transported by plane or automobile, depending upon the distance. The two main depots for these products are the laboratory in Boston and a state hospital in the western part of Massachusetts. The distribution of whole blood is a complex matter which is still in the process of development. At the present time, arrangements are being made for the transportation of whole blood only to certain designated depots in large communities. These depots are usually in large hospitals already provided with the necessary refrigerator storage-space. Local, small community hospitals are at present required to transport needed whole blood from these depots directly to their own institutions.

With the co-ordination of hospital blood banks with the state program, it became necessary to develop some administrative supervision and to establish standards of techniques to be used by these hospital blood banks. The obvious purpose of this was to achieve efficient co-ordination of the programs and at the same time to ensure the safety and quality of the product. The Massachusetts Department of Public Health has the authority to license hospitals, not only with regard to physical plan but also operational procedures. The Department is now drawing up minimum standards applicable to various sized hospitals for blood-typing laboratories and for facilities for the storage of blood. The Department of Public Health is also planning to standardize the supervision of blood banks in larger hopsitals where bleedings are performed.

The delineation of responsibility between the American National Red Cross, which acts as the procurement agency, and the Massachusetts Department of Public Health is important. The Department is responsible for the actual collection of blood, its transportation, processing, and distribution. It is also responsible for the establishment of contacts with hospitals and physicians for the education of personnel in methods and techniques employed or recommended by the Department. Public health and hospital administrators realized that the stimulus derived from the use of blood and blood products in the armed forces would be reflected in civilian practice after the war. Moreover, the American public has become aware of the virtues and needs of blood and blood products and is demanding their use in their care. Thus, the Department has undertaken to keep the public informed of the objectives and operating schedules of its program. Periodic releases are made to the hospitals and medical profession.

Briefly, the plan for the Massachusetts Blood Program is to collect blood from volunteers from all communities. This is done by a mobile blood unit visiting communities on a pre-arranged schedule. The blood-mobile staff consists of a physician, five nurses, a medical technician, a blood custodian, and a truck driver. The unit carries all technical equipment required in the clinic. The physician is responsible for the clinic operation and the selection and care of donors. The nurses do the actual bleeding under the supervision of the physician. They also assist the physician in the selection of donors by taking a medical history. The medical technician determines the hemoglobin, blood group and Rh factor of each donor. The blood custodian is charged with the care, refrigeration and

storage of the bloods collected, and with the delivery of the blood to the central laboratory each night. The truck driver not only manages the equipment truck but also assists in setting up and breaking down of the clinic. He also assists generally in the clinic operation.

At its inception, the Massachusetts Blood Program was divided into three phases. The first was to procure bloods for the preparation of blood plasma. However, the abrupt ending of the war and the return of the surplus plasma from the armed forces to state health departments provide a sufficient amount of plasma to meet the present needs. The second phase of the program was to collect blood to be used for fractionation. Fractionation provides anti-hemophilic globulin, thrombin and fibrinogen for the preparation of fibrin films and fibrin foams, blood grouping globulin and anti-Rh typing serum, immune serum globulins and salt-poor albumin. The third phase was to provide whole blood, and this presented many technical difficulties in the distribution and storage of such an unstable product.

Because of the highly technical nature of blood and blood products processing and distribution, it was necessary to provide additional space in the Massachusetts Department of Public Health Division of Biologic Laboratories building. This was accomplished only through the generosity of the Godfrey M. Hyams Trust, which made possible the construction of an addition containing approximately 12,000 square feet and costing $190,000. By legislative appropriations, the building was equipped at a cost of approximately $98,000 and the Department was then in a position to implement the program.

Many delays were encountered in construction and equipment procurement. The program actually got under way on December 3, 1945, and moderate-scale fractionation began on October 15, 1946. Because of the delays encountered in obtaining equipment for fractionation and in the procurement of a fair supply of whole blood, it was decided to begin limited whole-blood distribution in September, 1946. This provided a means of working out some of the technical problems of whole-blood distribution.

Since the inauguration of the program on December 3, 1945, the blood mobile unit has visited 68 communities and has held 165 clinics through March 31, 1947.

During this period 13,252 blood donors have been registered and 1,975 have been rejected for various reasons. A total of 10,901 bloods collected have been returned to the central laboratory for processing and 77 bloods have been sent directly from the bleeding clinic to local hospitals for emergency use. Of the 10,901 bloods delivered to the Blood Processing Laboratory, 2.3 per cent were rejected as unsuitable for use either as whole blood or for fractionation, 52.7 per cent has been used as whole blood, 42.5 per cent for fractionation and 2.5 per cent as plasma.

One of the most interesting phases of this program has been the noticeable annual increase in the use of blood and blood plasma. Fractions of plasma have as yet not accumulated in sufficient amounts to allow distribution on a large scale. The use of such fractions is, at present, limited to clinical trials.

Figure I presents a graphic picture of the increased use of blood and blood

plasma during 1946 as compared to 1943 and the estimated amounts required in 1947. These figures were obtained from replies to a questionnaire sent out by the Department of Public Health to Massachusetts hospitals. These hospitals used over 20,000 units of whole blood in 1943 and this amount was increased to 27,965 units in 1946; the hospitals estimated that for 1947 the demand for whole blood will amount to a total of 33,173 units or an average of 3.4 pints of whole blood per hospital bed.

The survey of Massachusetts hospitals previously referred to has also shown that the use of *blood and blood plasma* expressed as *"units of whole blood"* has increased from an average of 2.12 units per hospital bed in 1943 to 4.8 units per hospital bed in 1946. It is estimated that, for 1947, this figure will climb to 5.9 units per hospital bed.

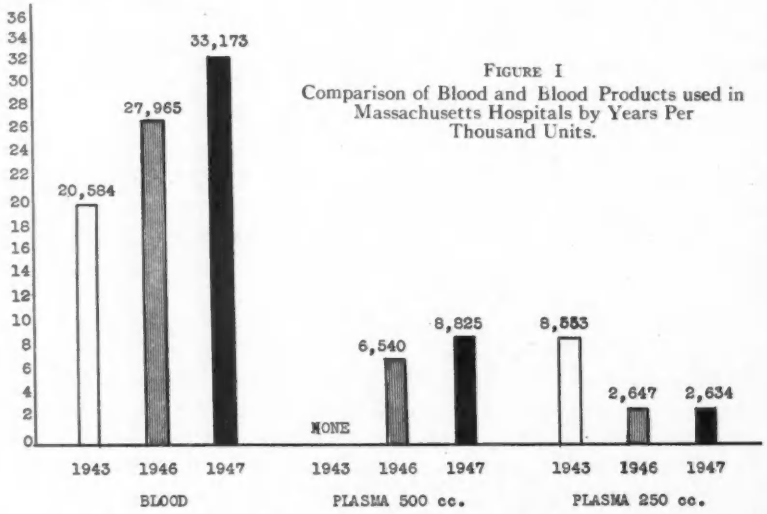

FIGURE I
Comparison of Blood and Blood Products used in Massachusetts Hospitals by Years Per Thousand Units.

A "unit of whole blood" may be defined as that amount of blood contained in 500 cubic centimeters and represents the amount usually obtained from a single donation. If one is to appreciate the amount of blood which must be obtained to satisfy the increasing demands for blood and blood products, it is necessary to appreciate the number of whole blood units as previously defined, which are required in the preparation of the products for distribution:

To prepare one 500-cc. unit of plasma, 2.5 units of whole blood are required;

To prepare one 100-cc. unit of 25 per cent albumin, 4 units of whole blood are required.

Consideration must also be given to the number of donors required to meet these needs. For every 100 donors recruited for donation, there are rejects because of acute colds, low hemoglobin, history of jaundice, and other causes. This rejection with those that fail to keep appointments averages about 25 per cent. Another 10 per cent of the blood collected cannot be used as whole blood. For example, blood from a donor with a history of malaria or a tour of duty in malarious areas, even though he may not have had a known attack of malaria,

cannot be used for whole blood but may be used for fractionation. Also, bleeding difficulties sometimes result in short donations and such bloods must be used for fractionation. Of all bloods collected, an average of 10 per cent cannot be used for whole blood, but most of these can be used for fractionation. Over a period of fifteen months we found it necessary to reject only 2.3 per cent of bloods as totally unsuitable for use.

In Table I the blood requirements for the year 1947 are given. These results are based on the total hospital beds in the general hospitals of the Commonwealth as of March 1, 1946. The state and county hospitals are not included in this table, since many of these institutions use very little blood and have a large bed

TABLE I
BLOOD REQUIREMENTS, 1947
Based on Reported Hospital Beds
(Total Beds 21,312)
Exclusive of State and County Hospitals

Product	Number of Hospitals	Total Beds	Units Per Bed Per Year	Bloods to Provide	Useable Whole Bloods Required
Blood	184	21,312	3.4	1	72,460
Plasma					
500 cc.	184	21,312	0.9	2.5	47,950
250 cc.			0.2	1.25	5,328
Albumin					
(Estimated)	184	21,312	1.1	4.0	93,768
					219,506
35 per cent Added for Losses Due to Rejects, Short Donations, Failures to Appear					76,827
Goal of 300,000 donors required to meet estimated quota.					296,333

capacity. The general hospitals in the state of Massachusetts have a total of 21,312 beds. The anticipated amount of whole blood *per se* to be used in 1947 has been estimated to average 3.4 units per hospital bed. This means that 72,460 units of usable whole blood will be required. 47,950 more units of whole blood will be required to provide 500-cc. units of plasma (since 2.5 units of blood are used to produce one 500-cc. unit of plasma).

Furthermore, it will require 5,238 usable bloods to provide the required number of 250-cc. units of plasma. The use of salt-poor albumin must be estimated from the amount of plasma used. Since it requires four usable whole bloods to make one 100-cc. unit of 25 per cent albumin, it is estimated that 93,768 usable whole bloods will be required to meet the minimum needs for albumin. From these totals, it can be seen that 219,506 useable whole bloods are required if the estimated hospital needs for whole blood, plasma and fractions are to be met in 1947. With two "bloodmobiles" operating daily with each unit staffed and equipped to collect 100 to 125 bloods per day, approximately 50,000 bloods can be collected annually by the two units. This will not meet the estimated needs for whole blood for the year 1947. It remains to be seen whether the residents of Massachusetts will donate the 219,506 bloods required for the estimated blood needs for the coming year.

In order to obtain these 220,000 units of blood it will be necessary to sign up approximately 300,000 donors, since a 35 per cent shrinkage must be allowed due to rejections, short bleedings, difficulties in processing and the failure of donors to keep appointments. Thus 300,000 donors must be solicited in order to

obtain the 220,000 units required to meet the needs of the public. The State Department of Public Health is prepared to obtain approximately 50,000 units, leaving the remainder of 170,000 units to be obtained from other sources. These sources are, first, the surplus blood plasma made available by the American National Red Cross, and, second, collections of blood made by the hospital blood banks. It becomes apparent at once that the State Department as a whole, already expending approximately a quarter of a million dollars a year for the operation of the Blood Program, cannot at this time take on the entire responsibility for the provision of whole blood or blood fractions to all of the population. In order to preserve economy and efficiency in the program, it is therefore necessary to increase donor participation by the combined efforts of all concerned—the American National Red Cross, State Department of Public Health, and medical and hospital professions. Furthermore, it is absolutely necessary to integrate hospital blood banks in the program and to encourage the donation of bloods by relatives and friends of patients at the time a patient is admitted to a hospital. Only in this manner can the required blood be collected. This points out the interest in the development of a method of supervision and administrative control of local hospital blood banks. The gradual expansion of the State program is indicated. The establishment of blood banks in hospitals of 150 to 200 beds where such banks are not already in operation is also contemplated. However, a source of blood not yet entertained is the actual establishment of permanent bleeding clinics in large centres of population by the local chapters of Red Cross. The policy of the American National Red Cross has indicated the advisability of such permanent bleeding centres to local Red Cross Chapters and it is our hope that such centres may be set up in at least three of our communities: Boston with a metropolitan population of approximately two million, Worcester with a metropolitan population of 250,000, and Springfield with a metropolitan population of approximately 200,000. Permanent bleeding centres of this type are indicated and, in our opinion, are prerequisite to the success of obtaining sufficient quantities of blood to meet the demands of the public.

The initiation of our program has been complicated by mistakes and errors in judgment, which are not uncommon in the development of a new program on such a large scale. Our techniques, procedures, and operative maneuvers are constantly improving. Our program is now running smoothly and its sole requirement is more blood. We wish to express our appreciation for the success of this program to our advisory committees, to Dr. Cohn and his associates for the development of the process and their advice in setting up the laboratory, to the medical and hospital professions, to the state officials and legislature and to His Excellency the Governor, who have made this possible. The American National Red Cross has done yeoman work in the procurement of donors. I wish to stress the fact that the success of the program is dependent upon the co-operation of the medical and hospital professions and in the final analysis upon the public itself, since blood cannot be manufactured. The continuous, voluntary donations of blood by the people for their own use as a prepayment for future medical needs provides the "life blood" for this program.

Typing of *Bact. typhosum* and *Bact. paratyphosum* B by Means of Bacteriophage

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TYPING of *Bacterium typhosum* strains by means of Vi bactériophage, according to the method of Craigie and Yen, was introduced as a routine procedure in the Division of Laboratories of the Quebec Ministry of Health in September, 1941. Typing of *Bacterium paratyphosum B* strains by the Vi bacteriophage of Felix (5) was added to the routine in 1944.

We consider it no longer necessary to stress the utility of such typing to the epidemiologist, especially since the publication of the review of this subject by Felix in 1944 (6).

The purpose of the present report is to indicate the frequency with which the various types of *Bact. typhosum* and *Bact. paratyphosum B* have been encountered in the Province of Quebec, and to describe certain new, recently identified types which, when added to the series discovered by Craigie and Felix, permit the typing of nearly 100 per cent of V-form *Bact. typhosum* cultures.

The technique employed is that of Craigie (1), with a few modifications which will be described when discussing the new types.

Typing of *Bact. typhosum*

During the first two years, 1941 and 1942, of this work, only the preparations of phage II of the alpha (α) group were used because Doctor Craigie desired to obtain from us cultures that were refractory to these preparations; this limitation explains the large number of cultures that we failed to type in those years, as reported in our first communication (3) on this subject.

In 1943, the preparations of phage II of Craigie's sub-types were included in the routine and all *Bact. typhosum* strains isolated were tested with phage II preparations covering the following types: A, B_1, B_2, B_3, B_4, C, D_1, D_2, D_3, E_1, E_2, F_1, F_2, G, H, J, L, M. The proportion of strains that could not be typed was thereby greatly reduced.

In 1944, the new types D_4 and L_2, discovered by Felix (7), in England, were added to the above series with the result that we typed 17 cultures of type L_2 in 1945. We failed to type only 10 per cent of V-form *Bact. typhosum* cultures isolated in that year. In 1946, the proportion was reduced to 2.4 per cent.

Table I shows the results obtained during the five years from September 1,

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TABLE I

BACT. TYPHOSUM TYPING FROM SEPTEMBER 1, 1941 TO NOV. 1, 1946

Number of cultures examined 3596
Number of persons represented: 1933

Types	A	%	B_2	%	B_4	C	%
No. of cultures	281	7.8	229	6.4	1	822	22.8
No. of persons	152	7.9	104	5.4	1	428	22.0

Types	D_1	%	D_2	D_4	D_5
No. of cultures	211	5.9	64	23	37
No. of persons	70	3.6	53	9	20

Types	E	%	F	%	G	H
No. of cultures	920	25.6	310	8.6	1	10
No. of persons	499	25.6	185	9.6	1	2

Types	J	L	*Undetermined		W form	%
No. of cultures	9	17	558	15.5%	103	2.9
No. of persons	1	4	328	17.0%	76	3.9

*Homologous phage not available or cultures resistant to type II phage.

1941 to November 1, 1946. A total of 3,596 strains of *Bact. typhosum* were examined, isolated from 1,933 individuals. We succeeded in typing 2,935 of these, obtained from 1,529 persons; or 81.5 per cent of all strains and 79 per cent of the total of individuals represented. In decreasing order of frequency, types E, C, A, B_2 and D_1 are those most often encountered in Quebec Province; the single J-type culture which we found was from a person infected in Ontario where this type is not infrequently encountered (2); the source of infection of the person contributing the single G-type culture of our collection could not be determined.

From the number of strains that were not typed, according to Table I, must be subtracted 161 isolated from 40 persons infected in the course of the typhoid epidemic at Batiscan (3.9) in the autumn of 1941. These were later found to be of Craigie's type D_1. Similarly, 25 cultures from 21 victims of an epidemic at Les Buissonnets, near Montreal, were eventually found to be of type D_3. The typing of these two groups of cultures considerably reduces the number of cases of undetermined type. Furthermore, during the early years a rather large proportion of W-form cultures, refractory to any Vi bacteriophage, was encountered. By improving our technique of preserving cultures, we have reduced almost to zero the number of W-form observed (1 of 375 in the year 1946). Every fishing from the seeded plate is transferred to a nutrient agar slant of pH 6.0 (as well as to the usual triple sugar agar), incubated 18 hours at 37°C. and then placed in the refrigerator until the identification of the organism is completed. The acidity of the agar slant inhibits lytic action by any accompanying bacteriophage which might transform the culture from the V form to the W form. The V-form strain grows well in the presence of its bacteriophage which little affects it, with the result that both the bacteriophage and its homologous V form

strain can often be isolated. The use of a neutral or alkaline agar, on the other hand, may permit ready isolation of the bacteriophage, but very often the culture obtained is of the W-form (secondary growth after lysis of the V form) which cannot be typed.

In Table II are shown the results obtained from 375 cultures examined during the first ten months of 1946. These cultures are included in Table I covering the 5-year period, but in this second table are indicated the type subdivisions because of the new sub-types that we have identified, tentatively, pending confirmation by the author of the typing method, Doctor Craigie.

These 375 cultures were tested with all the individual phage II preparations

TABLE II

BACT. TYPHOSUM TYPING 1946

(January 1 to November 1)

Types	A	B_2	B_3	B_4	C	D_1	D_2	D_3	D_4	D_5	E	F
No. of cultures	48	11	0	0	68	13	0	1	5	7	161	49

Types	G	H	J	L	M	Resistant to type II phage	W form
No. of cultures	1	1.	0	0	0	9	1

Untyped cultures: 2.68%

Type A				Type E				Type F	
Craigie's type A	A phage I neg.	A phage III neg.	Type B_1	E_1	E_2	E_3	E_4	F_1	F_2
14	23	4	7	89	2	27	43	43	6

of Craigie's 1939 series, on nutrient agar containing 5 per cent glycerol, with overnight incubation (16-18 hours) at 37°C. They were tested also with the individual preparations of phages of types I, III and IV at concentrations one-hundred times the "critical test concentrations" for the cultures on which they have propagated (F_1 for phage I, and E_1 for phages III and IV). The use of these three individual phages, in addition to indicating whether the culture under test is of the V form or W form or a mixture of the two, often permits recognition of certain variations within the limits of a single type. It was in this way that we discovered that certain type A strains (see Table II) differ from Craigie's original strain in that they are not lysed by phage III. Type II phage, when propagated on these cultures, lyses only the type A strain at the critical test concentration; and we have failed to detect the presence of symbiotic bacteriophage in these cultures.

We have encountered also several cultures giving the reactions of type A (complete lysis with all phage II preparations) which are lysed only very slightly, or not at all, by phage I. From these cultures, however, we have succeeded in isolating a bacteriophage which grows symbiotically with the bacteria, producing no change in the appearance of the cultures, and which is not attenuated by several transplants. When phage II is propagated on certain of these cultures, it attacks only those of type A, whereas if it is propagated on other apparently similar cultures the resulting phage II lyses all types at the critical test concentration: an indication of the presence of a symbiotic phage. We have not succeeded in determining the type of this lytic agent by means of the neutralization test.

In the typhoid outbreak, following a wedding breakfast, that we recently reported (4), a strain of *Bact. typhosum* was isolated which we tentatively designated as type D_5. There, again, the reactions with phages I, III and IV were different from those usually observed. This strain was "lysed perfectly by phage I, imperfectly by phage IV and with great difficulty by phage III." Previous to this outbreak, strains giving such reactions were very seldom encountered, but we have since found that their behavior is markedly affected by the culture medium employed. Type D_5, in fact, gives the same reactions as type D_1 of Craigie if agar containing 5 per cent of glycerol is used. This agar also permitted preparation of the homologous phage II.

The addition of the glycerol to the nutrient agar results in doubling the diameter of the plaques produced by the bacteriophage. As a rule, the critical test concentration is at a dilution ten times that when agar without glycerol is used. With type D_5 this phenomenon is greatly accentuated because a concentration of 1,000, and even 10,000 times is required for the phage to produce complete lysis on agar without glycerol, but it then lyses completely all heterologous types; whereas, when glycerol is added to the medium, such types are not lysed at the critical test concentration of phage D_5.

It should be noted that although the glycerolated agar is markedly superior for testing strains of certain types, its use often results in cross-reactions with strains, especially those of type B_2.

The characteristics of the types D_1 and D_5 may be indicated as follows:

PHAGE D_1

Types	10^0	10^1	10^2	10^3	10^4	10^5	10^6	N.A.
D_1	CL	CL	CL	CL	CL	SCP	+n	N.A.
D_5	CL	CL	—	—	—	—	—	N.A.
D_1	CL	CL	CL	CL	CL	CL	SCP	G.A.
D_5	CL	CL	CL	CL	CL	CL	SCP	G.A.

PHAGE D_5

Types	10^0	10^1	10^2	10^3	10^4	10^5	10^6	
D_1	CL	CL	CL	CL	CL	SCP	+n	N.A.
D_5	CL	—	—	—	—	—	—	N.A.
D_1	CL	CL	CL	CL	CL	SCP	+n	G.A.
D_5	CL	CL	CL	CL	CL	CL	SCP	G.A.

G.A. = Glycerolated agar
CL = Confluent lysis
N.A. = Nutrient agar
SCP = Semiconfluent plaques
n = Normal plaques
\+ = Isolated plaques

Summary

	PHAGE D_1	PHAGE D_5*	
Type D_1	CL	CL	N.A.
Type D_3	—	CL	N.A.
Type D_1	CL	CL	G.A.
Type D_5	CL	CL	G.A.

*Phage D_5 = C.T.C. determined on glycerolated agar.

According to these indications, type D_5 may be considered a modification of type D_1*.

Toward the end of 1944 and early in 1945, we isolated, from 7 persons of the Maniwaki district, Gatineau County, 17 strains refractory to all phage II preparations. A sample of faeces and one of urine taken on the same day from one of these individuals both yielded strains of *Bact. typhosum*. The culture from the faeces was completely refractory to phage II, whereas that from the urine was moderately lysed by phage E. Phage II, when propagated on this culture, lysed perfectly that from the faeces as well as all the refractory cultures from the Maniwaki district and, also, cultures of type E_1 and type E_2. The possession of this new phage permitted typing of several strains, previously reported refractory, from other districts of the province. This new subtype of type E has been designated as type E_3.

A few weeks later, another strain was isolated which was only moderately lysed by phage E_3. All attempts to propagate Craigie's phage II on cultures of this organism have been, thus far, unsuccessful; but another strain of phage II, which we isolated from a culture of type E in 1943, was easily adapted to this otherwise refractory culture and produced a phage designated by us as type E_4 because of its reactions with other subtypes of type E cultures which may be summarized as follows:

Types	Phage E_1	Phage E_2	Phage E_3	Phage E_4
E_1	CL	CL	CL	CL
E_2	—	CL	—	CL
E_3	—	—	CL	CL
E_4	—	—	—	CL

The new phage E_4 has been used to type numerous strains refractory to all other phage II preparations. Fourteen cultures from 7 persons of Bouchette, Gatineau County, were found to be of type E_4. It will be recalled that the cultures from Maniwaki, in the same county, are of type E_3.

The typhoid outbreak at Victoriaville, Quebec, and at Windsor, Ontario, reported by Foley and Poisson in 1945 (8) was caused by a strain of *Bact. typhosum* that we were unable to type in 1944; the cultures which we preserved are lysed perfectly by phage E_4. Some thirty cultures from this outbreak were isolated from 23 Victoriaville patients. It would be interesting to know whether the Windsor strains were also of type E_4; according to Foley and Poisson (8), these two outbreaks were both probably caused by the consumption

*Since the preparation of this report, Felix's type "D_5" was received and found to be entirely different from the strain designated by us as type D_5.

of contaminated cheese manufactured at Ste. Eulalie, near Victoriaville, and sold there and in Windsor, Ontario.

Of a total of 375 strains isolated in 1946, only 9 (2.4 per cent) have proved refractory to any of 22 preparations of phage II. Four of these strains are from the same city, Iberville, and one from Chambly Basin. These five cultures are not lysed by phage I and contain a symbiotic bacteriophage, like cultures of type A that are not lysed by phage I. The four other cultures are from 4 persons of Roxton Pond in the Eastern Townships; these strains are lysed completely by phages I, III and IV. To date, no success has attended our attempts to propagate Craigie's phage II on these 9 cultures.

The single strain of W form that we have encountered this year was isolated from a blood culture. All the colonies from this sample, even those on the original plate, were of W-form organisms.

The strains of *Bact. typhosum* isolated since the first of the year were from cases scattered throughout the Province; no typhoid epidemic of any magnitude occurred during this period.

It may be added that all cultures giving doubtful results were examined by propagating on them Craigie's phage II and by testing the phage thus obtained with type strains.

Typing of *Bact. Paratyphosum B*

The procedure employed for typing strains of *Bact. paratyphosum B* by means of Vi bacteriophages of Felix covering types 1, 2, 3a, 3a I, 3b, is similar to that used for typing *Bact. typhosum* by Craigie's methods. In Felix's report (5), already mentioned, only four types were considered because the sub-type 3a I had not yet been identified. Felix summarizes the behaviour of these types toward the phages as follows (personal communication, February, 1944.)

Vi-Type Phages

Type strains	Type 1	Type 2	Type 3a	Type 3a I	Type 3b	Anti-O phage pooled
	1:20000	1:2000	1:1000	1:1000	1:1000	
Type 1	CL	CL	CL	CL	+++	CL
Type 2	—	CL	—	—	—	CL
Type 3a	—	—	CL	CL	OL	CL
Type 3a I	—	—	CL	CL	—	CL
Type 3b	—	—	—	+	OL	CL
Not typable (group Z)	—	—	—	—	—	CL

CL = complete lysis
OL = opaque lysis.

When typing of paratyphoid B strains was first adopted as a routine procedure, we incubated the cultures in accordance with the interrupted incubation method specified by Craigie (1); and the three anti-O phages (Nos. 1, 2 and 3) were applied to each culture as a mixture. We later modified this method:

instead of placing the Petri dishes immediately in the incubator as soon as they are seeded, leaving them there for 2½ hours, then removing them to the ice-box for the night and finally returning them to the incubator for four hours, we place the dishes in the ice-box as soon as they have been prepared, and at the end of the working day they are removed to the incubator where they are left until the following morning. If care is taken to determine the critical test concentration by the same incubation procedure, the results obtained are identical with those secured by using the interrupted incubation, with the advantage that time in the afternoon is available for tests and transfers; moreover, the technician can read the tests in the morning upon his arrival at the laboratory and immediately proceed with the replating or additional testing of cultures that may be required.

The three anti-O phages of Felix are applied separately to cultures, rather than as a mixture, for the same reason that the three phages of types I, III and IV of Craigie are used separately when typing *Bact. typhosum* strains, viz., to secure supplementary information relative to the behavior of each phage with the culture under test. The anti-O phages used for paratyphoid B typing, however, do not furnish as useful information, when employed separately, as do the Vi phages of type I, III and IV for typing typhoid strains.

Table III shows the results obtained from the examination of 317 cultures isolated from 157 persons.

TABLE III

BACT. PARATYPHOSUM B TYPING 1944–1946

Types	1	2	3a	3aI	3b	Untypable Group Z*
Cultures	25 (8%)	—	152 (48%)	13 (4%)	34 (11%)	93 (29%)
Persons	10 (6%)	—	86 (55%)	7 (4%)	19 (12%)	35 (22%)

Number of cultures examined: 317
Number of persons represented: 157

*From this group, 83 cultures were isolated from 28 persons in the same outbreak.

A comparison of the distribution of types of paratyphoid B strains isolated in England during the interval of April, 1940 to March, 1943 and reported by Felix (5), with that which we have found in this Province, is shown below:

	Type 1	Type 2	Type 3a	Type 3a I	Type 3b
England	69%	6%	17%	*	0.9%
Quebec	6%	0	55%	4%	12%

*Not included in the 1943 report.

Felix remarks, in his report, that type 1 was epidemic throughout the British Isles in 1941, but that the prevalence of this type was accidental and not due to any particular virulence of this type. Nevertheless, type 1 was that most frequently encountered. In the Province of Quebec this type is rarely found; type 3a is that most widely distributed; and even in the two areas where para-

typhoid B is most prevalent, the Gaspé peninsula and Beauce County, type 3a predominates. No strain of type 2 has yet been isolated in the Province.

We have not succeeded in typing 93 cultures isolated from 35 persons (group Z strains); 83 of these cultures, however, were from 28 persons infected in the course of an outbreak of paratyphoid B in a small maternity hospital at Lachute. The 10 other cultures of group Z were isolated from 7 persons residing in widely separated localities in the Province (Malartic, Abitibi, Quebec City, etc.).

We found that cultures from about half of the persons infected in the Lachute outbreak were not lysed by the anti-O phages, whereas the others were perfectly lysed by them. All strains isolated from the same person were similar: from 18 positive specimens from one individual we isolated strains not lysed by anti-O phages; from 6 positive specimens from another individual, strains lysed by these phages were isolated.

The identification of these Lachute strains was confirmed by Drs. C. E. Dolman and L. E. Ranta, of the Canadian Salmonella Centre, Vancouver, B.C., who reported them to possess the following antigens:

Strain resistant to anti-O phage: IV, V, XII . . . : b, - 1, 2
Strain lysed by anti-O phage: I, IV, V, XII . . . : b, - 1, 2

These two strains are equally resistant to Vi phages and all attempts to adapt them to these phages were unsuccessful.

When a culture is lysed by Vi phages specific for *Bact. paratyphosum B* (5) and its type can be determined, the identification of the culture as a strain of *Bact. paratyphosum B* may be affirmed even though complete differentiation from the other *Salmonelleae* organisms possessing the antigen "b" in common, according to the Kauffman-White classification of 1942, has not been attempted:

Bact. paratyphosum B:	I, IV, V, XII . . . : b − 1, 2 . . .
Bact. abony:	I, IV, V, XII . . . : b − e, n, x . . .
Bact. abortus bovis:	I, IV, XXVII, XII . . . : b − 3, n, x . . .
Bact. schleissheim:	IV, XXVII, XII . . . : b, $^{z}12$ −
Bact. onarimon:	I, IX, XII . . . : b − 1, 2 . . .
Bact. mississippi:	I, XIII, XXIII . . . : b − 1, 5 . . .
Bact. kvittingfoss:	XVI . . . : b − e, n, x . . .
Bact. kirkee:	XVII . . . : b − 1, 2 . . .
Bact. minnesota:	XXI, XXVI . . . : b − e, n, x . . .
Bact. urbana:	XXX . . . : b . . . − e, n, x . . .

The cultures of group Z, refractory to Vi phages, must, of course, be identified as paratyphoid B organisms by employing all the various sera necessary for complete differentiation from other *Salmonelleae* bacteria. Thus, when we encountered cultures lysed by the anti-O phages, not lysed by Vi phages, not agglutinated by O sera covering groups A, B, C, D, E of the Kauffman-White classification, but agglutinated by Paratyphosum B "H" ("b" antigen) serum, we were unable, with the sera in our possession, to identify the organisms; Dr. P. R. Edwards, of the Salmonella Centre at the University of Kentucky, kindly identified them as *Salmonella minnesota*.

Summary

The typing of *Bact. typhosum* by means of Vi bacteriophages of Craigie was adopted as a routine procedure in the Division of Laboratories of the Quebec Ministry of Health in 1941; typing of *Bact. paratyphosum B* was added to the routine in 1944.

Modifications of the original technique of Craigie as regards culture incubation and composition of media facilitate the use of phage typing in a public health laboratory and have permitted the identification of certain new types of *Bact. typhosum.*

In the past five years, 3,596 cultures of typhoid strains from 1,933 persons were examined. During the first ten months of 1946, a total of 375 cultures were examined, and 97.4 per cent were successfully typed. Nine V-form cultures proved refractory to phage II and only one W-form culture was encountered. New types, tentatively designated as D_5, E_3 and E_4, are described. Certain modifications of Craigie's type A are indicated. The predominant types in Quebec Province are, in order, E, C and A.

A total of 317 cultures of *Bact. paratyphosum B* isolated from 167 persons were examined by means of Vi bacteriophages of Felix. Type 3a is the predominant type in the Province of Quebec whereas type 1 is the most frequently encountered in the British Isles, where the first work on Para B typing was done. Determination of the type of *Bact. paratyphosum B* serves to identify all strains of *Bact. paratyphosum B,* as such.

ACKNOWLEDGMENTS

I take pleasure in expressing my gratitude to Doctor J. Craigie for his continued interest and advice throughout the past several years; to Doctor A. Felix, Director of The Emergency Public Health Laboratory Service, who kindly supplied various *Bact. paratyphosum B* strains and type bacteriophages; and to Mr. M. H. McCrady for aid in the preparation of this report.

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Proposed Report on the Educational Qualifications of Medical Health Officers

THE Executive Council of the Canadian Public Health Association has given preliminary approval to the following proposed Report on the Educational Qualifications of Medical Health Officers. This will be the first of a series of reports of the Committee on Professional Education. This committee felt that the existing reports of the American Public Health Association on the qualifications and requirements of various types of individual engaged in public health had been prepared with such care and mature deliberation that it would be a duplication of effort to start anew in formulating similar Canadian reports. Consequently, the American Public Health Association reports have been adapted as *proposed* reports for Canadian use, with the approval of the American Public Health Association.

The Executive Council approved a system whereby the reports would be published in the Journal as proposed reports and would be open to criticism for a period of approximately eight months, after which time they would be rewritten to include any constructive criticisms received by the committee. The revised report will then be submitted to the Executive Council for final approval, following which it will be re-published in the Journal.

This series of reports will be subject to constant revision over the years in order to keep them up to date with the changing picture in public health.

Members wishing to offer criticism or suggestions should address them to the Chairman of the Committee on Professional Educational, Canadian Public Health Association, 150 College Street, Toronto 5.

I. General Scope of the Field

A. Specific Contribution to Public Health by Workers in this Field.

It has long been established that public health is a concern of government and the necessity for an official designated by law as health officer is universally recognized. Past accomplishment of the health officer and his associates as measured by the prevention of sickness and death and the prolongation of life is a matter of common knowledge. As progress has been made in certain fields of preventive medicine, other and more complex problems have come into prominence, such as accident prevention, the prevention or amelioration of the chronic and degenerative diseases, and the maintenance of optimum health. Scientific discoveries of wide practical application have been rapid in the past few decades and the demand for public services for the prevention and cure of disease has become greater and in all probability will so continue. Opportunities for challenging and constructive service in the field of public health have developed rapidly and the needs for specific education and training have increased accordingly.

The health officer's responsibilities vary considerably in different public health organizations, but in general he has administrative responsibility for all activities of the official health agency operating in the area and directs the staff promoting those activities.

The provision of medical care, or the administration of a medical care program in certain special fields or as an emergency activity, has with increasing frequency been accepted as a responsibility of official health agencies. The

medical treatment of a large proportion of persons suffering from the venereal diseases, tuberculosis, and certain of the acute infectious diseases has for some time been directly or indirectly the responsibility of health departments, as has a medical and surgical treatment program for the physically handicapped in many communities. Partial responsibility for the treatment of cancer and other chronic diseases is something assumed by the health department. There are indications that the health officer's responsibilities in the field of medical care may be increased rather than decreased in the future.

B. Future Outlook

It is generally recognized that there should be coverage of every population and area unit of our nation with competent, full-time local health service.

Local communities in Canada are now being served by approximately 500 full-time medical health officers. The majority of full-time local health officers are employed by cities, counties, and combinations thereof. In some provinces, district medical health officers on the staffs of provincial departments of health are assigned to local areas and render direct service. A large number of individuals qualified as medical health officers are employed by federal and provincial agencies and by voluntary organizations. The establishment of new subdivisions within health departments to provide service in the fields previously neglected by the official agencies, such as accident prevention, cancer control, general nutrition, and industrial hygiene, gives reason to believe that the future will show expansion into new fields as well as an intensification of the existing activities of the health agency.

II. Function of Health Officers

Many functions of the health officer are defined by statute, such as his power to enforce sanitary laws and regulations, his responsibility for the preparation of budgets and the proper expenditure of funds. He has also the important functions of interpreting public health activities to governing bodies, co-ordinating the activities of official and voluntary agencies, performing the duties of a public office and of assuming a position of leadership in the community in all matters pertaining to health. The term "public health" means the health of the public and the responsible officer must have a broad enough field of vision to encompass all that the term implies. Besides undertaking administrative duties and exercising leadership in his field, the health officer takes part in specific activities for disease prevention and control, using technical procedures that call for a high degree of medical and sanitation knowledge. In larger organizations the health officer may not personally render direct service but directs and evaluates the work of his subordinates and must be able to exercise both technical skill and professional judgment in so doing. The health officer's position is such that he may have broad opportunity for special studies and research in public health. In smaller localities he may perform all or numerous medical and other professional functions himself. In general, the health officer must have sufficient training to permit him to intelligently assume some responsibility for the proper development of the official agency's activities in the following fields:

1. Environmental sanitation including water, milk, and food sanitation, insect and rodent control, nuisance abatement, and housing.
2. Acute communicable disease control.
3. Tuberculosis control.
4. Venereal disease control.
5. Child hygiene.
6. School hygiene.
7. Dental hygiene.
8. Maternal hygiene.
9. Public health laboratory service.
10. Vital statistics.
11. Public health nursing.
12. Public health education.
13. Industrial hygiene.
14. Nutrition.
15. The chronic or degenerative diseases.
16. Mental hygiene.
17. Accident prevention.
18. Medical care administration.
19. Audit and accounts.
20. Personnel management and training.
21. Hospital administration.

—all of which presupposes a working knowledge of the governing legislation where applicable.

A. Lines of Promotion

In large local jurisdictions and in federal and provincial agencies there are numerous subordinate positions, such as those of deputy and assistant health officer. Several grades of positions with administrative duties are provided, and there are definite lines of promotion. The health officer showing ability may progress from the administration of small official health units to positions of responsibility in larger organizations or larger areas, or may advance from a subordinate position such as an assistant health officer to full responsibility for the direction of a department, agency, or district. In general, a classification of health officers includes the following titles descriptive of the area of jurisdiction, or degree of responsibility: provincial, municipal, district or county medical officer of health; deputy medical officer of health; assistant medical officer of health or deputy health officer; assistant and senior public health officer or physician.

III. The Educational Background of Health Officers

The basic educational background for the position of health officer should be as follows:

1. Completion of a course leading to the degree of Doctor of Medicine in a medical school approved by the Council on Medical Education and Hospitals of the American Medical Association.
2. Internship of at least one year in an approved general hospital, preferably including communicable disease service.
3. Eligibility to examination for medical licensure in the province where service is to be rendered.

IV. Graduate Education and Training

Graduate education and training for the position of health officer should include the following:

1. Preliminary supervised field training in a well-organized health department for a period sufficient to give acquaintance with the general aspects of public health and to give the candidate an opportunity to determine his own liking and fitness for such work.

2. Completion of a program of study leading to a degree in public health of not less than one full academic year in an approved university. The university in which such a program of study is pursued should have a well-organized school or department of public health with a corps of full-time instructors recognized as leaders in their respective fields, ample laboratory, library and other facilities, and access to official and voluntary health agencies willing to provide facilities for field training and experience. The program of study should cover the general field of public health administration, biostatistics, environmental sanitation, epidemiology, health education, laboratory methods, public health nursing, physiological hygiene, and the socio-economic aspects of health and disease, and should be accompanied by special instruction in the application of basic principles to the functions and duties of a public health administrator.
3. An additional year of practical experience in a subordinate position is highly desirable before the graduate in public health assumes full direction of even a small health unit.
4. Full-time practical experience is an essential part of the education of the health officer, and it is recognized that great achievement can usually be attained only after an adequate period of experience. Physicians otherwise qualified who have achieved notable success and who have had many years of full-time experience in a well-organized health agency may be considered as qualified to serve as health officers even though lacking formal academic training in public health. However, it is to be emphasized that an exception to the requirements of a post-graduate course and supervised field training should be made only if the candidate, in addition to years of experience, has actually demonstrated unusual ability as a public health administrator.
5. If the health officer is vested with the administration of a medical care program, efficient performance of these functions requires knowledge and skills of a special nature. Courses of instruction in this field should be included in the postgraduate course in public health, at least as electives in the program of training of potential health officers. Instruction should include courses in the socio-economic aspects of health and disease and in methods of establishing standards of quality of medical care, budgeting requirements and special administrative techniques, including hospital administration.

V. Personal Qualities

The health officer should possess the qualities of personality and character necessary to insure the successful prosecution of his duties. These include such qualities as leadership, the ability to establish and maintain favourable relations with the public and his own personnel, creative ability, far-sighted sound judgment and common sense, and the will to serve honestly and industriously at all times, subordinating his own desires to the best interests of the community.

Canadian Journal of Public Health

THE CANADIAN RED CROSS BLOOD TRANSFUSION SERVICE

AT the recent meeting of the State and Provincial Health Authorities of North America held in conjunction with the thirty-fifth annual meeting of the Canadian Public Health Association in Quebec, Dr. Vlado A. Getting presented a paper entitled "The Importance of Blood and Blood Fractions in Public Health", in which he outlined the very comprehensive provision which is now being planned and initiated for all Massachusetts. This interesting paper is published in this issue of the Journal. Dr. Getting points out that adequate medical care in Boston is not possible without the proper supply of whole blood and blood derivatives. In Massachusetts in 1943, approximately two pints of blood and its equivalent in plasma were used per hospital bed. In 1946 this had increased to 4.2 pints and it is estimated that in 1947 the use of whole blood and plasma will be approximately 6 pints per bed per year. It is recognized that in the past the cost of supplying blood has been such that its use has been greatly limited even though highly successful blood banks have been established in many hospitals. It is true also that supplies of blood have not been available in many of the smaller centres. With the co-operation of the American National Red Cross, a state-wide plan was placed in operation in December 1945. During 1946 about fifty per cent of the quota of blood was obtained, indicating the necessity of intensive education of the public in regard to the importance of continued donations.

In addition to whole blood, blood fractions including salt-poor serum albumin, globulins, immune serum globulins and fibrin preparations have been made available. The proper typing of blood has been possible by a slide-technique typing of the donor prior to the collection of his blood followed by a subsequent check at the Laboratory from the serology specimen attached to each flask of blood. Typing sera for this purpose are produced in the project. Two typings, including the determination of the Rh factor, are made for each donation. The Massachusetts plan has been eminently successful. Its only requirement is the achievement and maintenance of an adequate number of donors.

The preparation of dried human blood serum is one of the most important chapters in Canada's war effort. At the commencement of the war, Dr. C. H. Best, of the University of Toronto, was engaged in studies of surgical shock

and demonstrated the value of serum in its treatment. He at once undertook to prepare human serum for use in the treatment of war casualties and in the Department of Physiological Hygiene in the School of Hygiene installed the first drying equipment which would permit of the forwarding of the serum in a stable condition. Dr. Best demonstrated also that pooling the sera from a number of persons produced a pooled serum which could be given safely to patients of any blood type. Work was rapidly extended and in 1941 was transferred to the Connaught Medical Research Laboratories where the project was conducted under the direction of Dr. Albert Fisher. More than 500,000 bottles of dried human blood serum were forwarded from the Laboratories, representing approximately two and a quarter million donations from all parts of Canada. The Canadian Red Cross Society presented the appeal to donors and collected the blood and aided in every way the development of the program. The Department of Pensions and National Health and later the Department of National Health and Welfare financed the necessary expenditures for supplies and for the technical services in the preparation and drying of blood. The Connaught Medical Research Laboratories supplied the laboratory accommodations and contributed the services of scientific and directorial staff. Later, the University of Montreal assisted also in providing facilities.

With the close of the war, The Canadian Red Cross Society arranged for a survey of existing transfusion facilities in Canadian hospitals in order to determine if a national plan should be developed to continue to provide essential supplies of blood for civilian use throughout Canada. In October 1945, Dr. W. S. Stanbury, who had extensive experience as N.E. Regional Blood Transfusion Officer in the Ministry of Health in Great Britain, presented his findings and outlined a plan for a Canadian national blood transfusion service. It was proposed that the service should provide, free of charge, not only whole blood but also blood typing sera, dried plasma, transfusion equipment and technical advice and assistance in problems relating to transfusion therapy. Research projects were also contemplated. The project has been favourably received by the Federal authorities and by all of the provincial governments. British Columbia is the first province to implement the plan and the service is already being provided. In Alberta the necessary laboratory facilities are being provided in a new building and it is expected that the service will be commenced in the very near future. In Saskatchewan and Manitoba plans are well advanced. It is gratifying, therefore, that so much progress has been made in the development of a national plan for Canada.

As Dr. Getting has outlined, there is a very distinct relation of this program to public health. In Canada over 21 per cent of all maternal deaths in 1943 were due to haemorrhage. In 1944 over 6,800 Canadian civilians met violent deaths. It is very evident that blood can be used with great effectiveness if it is available. The usefulness of the service has already been demonstrated in British Columbia though the plan has not been in operation for an extended period.

The national plan providing for every citizen is one worthy of Canada. It is a life-saving service of proven value. It will be made possible by united effort and the willingness of all to contribute their part to its success.

*The Canadian Public Health Association 1946-1947**

(Part III)

REPORT OF THE SUB-COMMITTEE ON ESSENTIAL PUBLIC HEALTH NURSING

STUDY COMMITTEE, PUBLIC HEALTH NURSING SECTION

AT a meeting of the Study Committee on May 7, 1946, plans were laid for study of the question, "What is essential public health nursing?" It was decided that the sub-committee to study this question would be made up of nine members, one from each province, and that the representative from each province would choose her own provincial committee, which would include representatives from both official and voluntary organizations, and those preparing public health nurses as well as those active in the field. The study was planned to cover a five-year period, with a yearly progress report. Accordingly, vice-chairmen were appointed from each province and early in August a statement of objectives of the study was sent by the parent committee to each of these representatives. The objectives were stated as follows:

1. To study the present-day and probable future trends in welfare programs and to determine the health aspects of these programs.

2. To determine what functions the public health nurse can best perform in order to make her greatest contribution to the above programs and to state specifically what services public health nurses should render to the individual family and community in order to fulfill these functions.

Since our meeting in May, 1946, the committee has felt that there is some urgency for a clear statement from public health nurses in Canada as to their concept of their functions. Due to shortage of personnel and expansion of programs in public health nursing, many nurses feel we must free ourselves from functions we now perform which cannot be classified as public health nursing. If we are to do this, we require a clear statement of the essential functions of the public health nurse and it should be available at as early a date as possible. Therefore, the committee has agreed that the study should be completed within two years more rather than the five years originally proposed; that is, the report should be available for the annual meeting of 1949 at the latest and before this date if possible.

During this winter several suggestions regarding the best procedure for the study have come from a few of the provincial committees. Although it must be admitted that contact with the provincial committees has been incomplete due to

**Reports presented at the thirty-fifth annual meeting of the Canadian Public Health Association, held in the Château Frontenac, Quebec, May 19-22, 1947.*

the slowness of the correspondence method of communication, the prevailing opinion we have been able to obtain is that in order to attain our objective, we must determine, through methods of sociological study, what services needed by the community could be rendered best by public health nurses and that this study should be made by someone far enough removed from welfare work to maintain an attitude of complete objectivity, but having a thorough understanding of health and welfare needs in the community. It has been suggested that someone engaged in sociological study or research might be a suitable person to conduct such a study. It is realized that this would require the full-time services of such a person for a while and that the individual would have to be paid. However, it is felt that such a method of study would be most likely to give the results we seek, and that the resulting clarification of functions would affect not only public health nurses but also other workers; and if the results were intelligently applied, could result in infinitely improved welfare services to Canadians. Therefore, the committee suggests this method of study as being in its opinion the most desirable and, before going on to other plans, would like to know if funds for such a purpose could be made available.

ISOBEL BLACK,
Chairman, Study Committee,
Public Health Nursing Section.

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(*Report of the Committee on Nominations*)

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